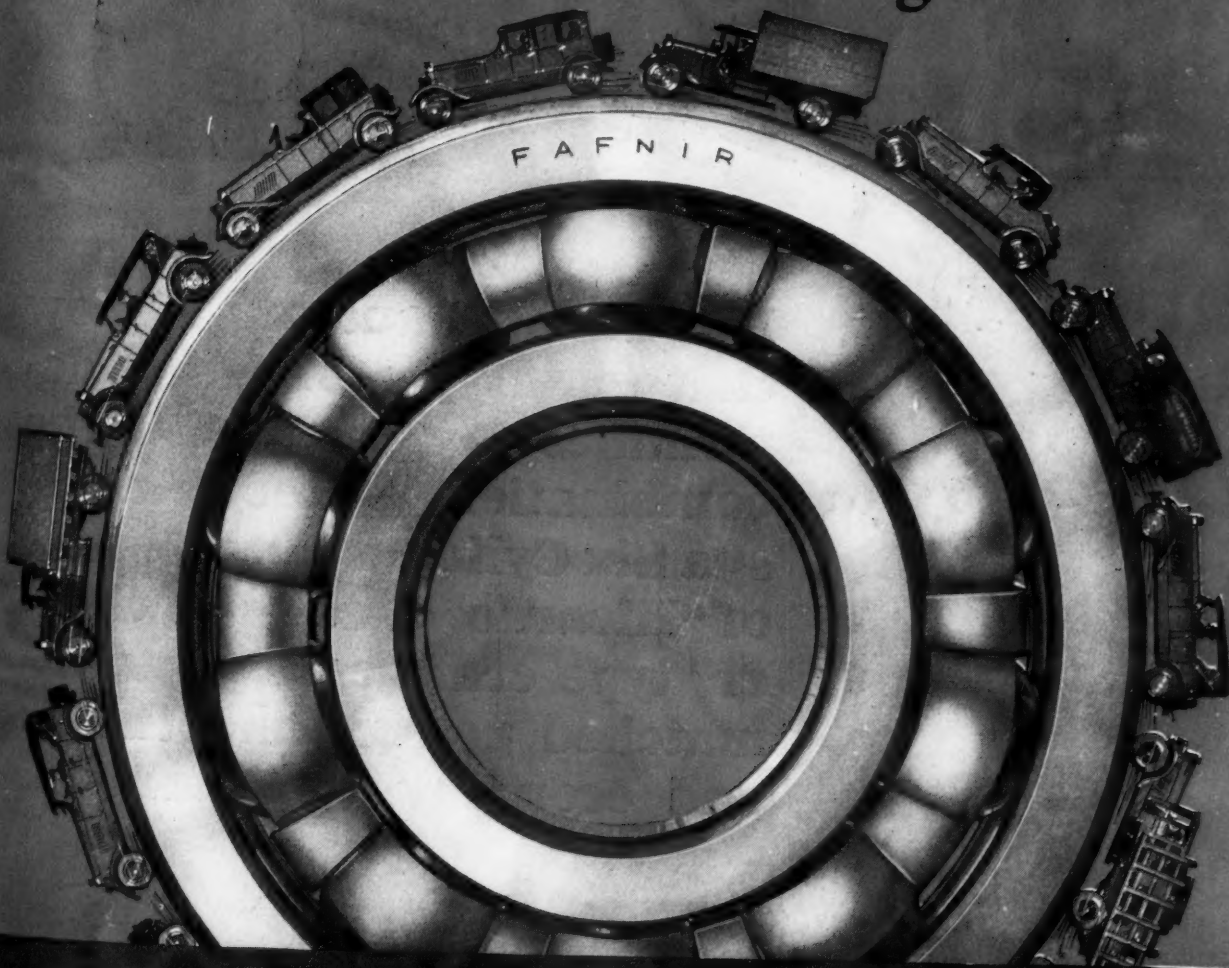


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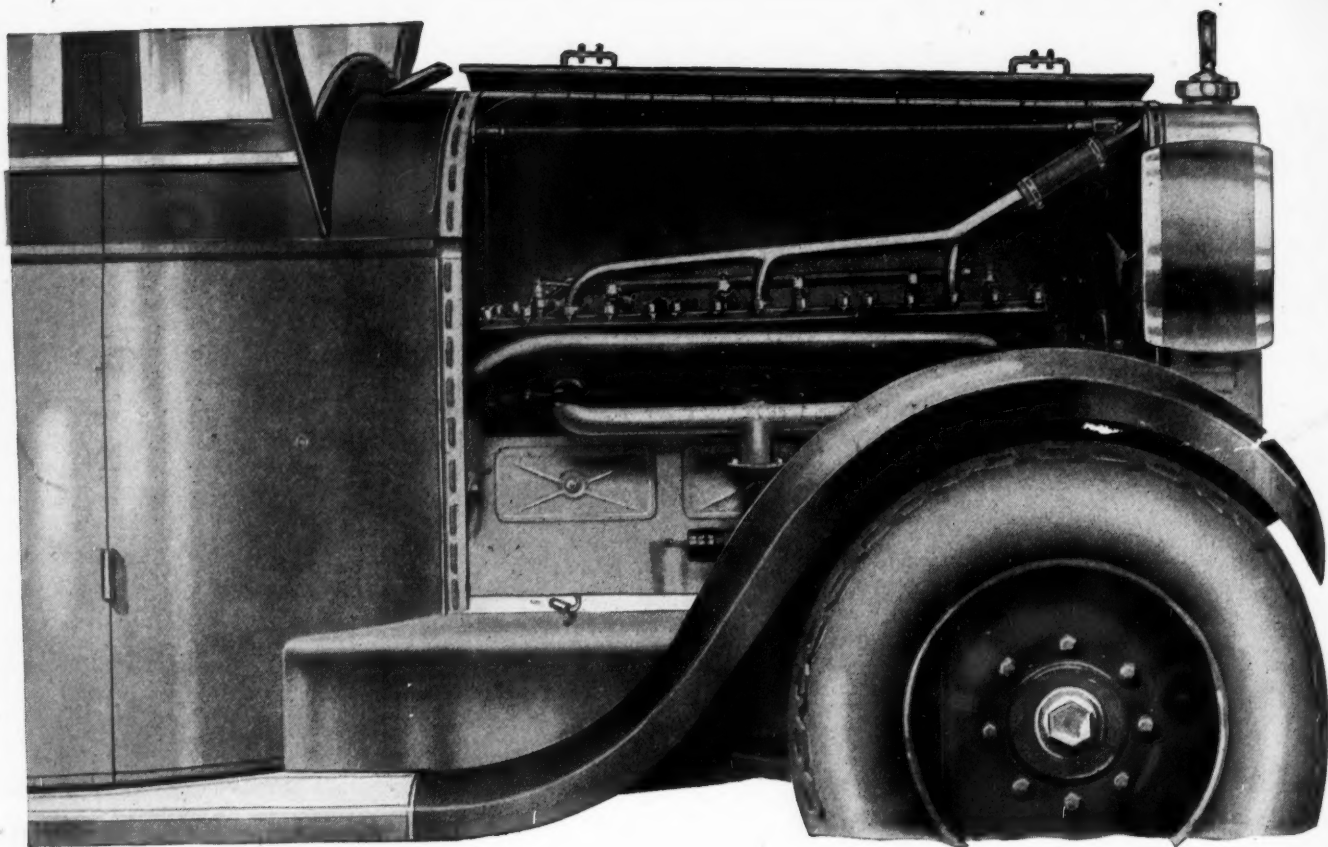
A Smoother Path for Automotive Progress —the Ball Bearing



FAFNIR BALL BEARINGS



THE FAFNIR BEARING CO. New Britain Conn.,-Detroit-Chicago.



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Waukesha
Ricardo Head
Six Cylinder Bus Motors

WAUKESHA MOTOR COMPANY
Waukesha Wisconsin

Eastern Sales Office

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New York City

Business Good and Getting Better, Factories Optimistic

Growing volume of orders and Spring weather combine to produce happy outlook. April likely to be record-breaker. Retail sales stressed above production. How used cars figure.

By Norman G. Shidle



NOBODY can make the rounds of the automobile factories today without coming away with a smile. Everywhere you go the story is almost the same—"Business has been picking up for several weeks and current reports indicate a continuance of sales acceleration for some weeks to come."

And everybody is talking in terms of retail sales. There has been a definite change during the last two years in method of judging automotive conditions.

Once upon a time the reply to the question "How's business?" almost invariably was given in terms of factory production. Today it is given almost as invariably in terms of retail sales of new cars.

There's got to be one more change before the final attitude is developed. Used cars must come to be thought of automatically in relation to new car sales—but of that a bit more later.

Cars in all price classes have been getting the benefit of increased demand and the whole outlook is considerably brighter than it was four or five weeks ago. The first two months of this year were somewhat disappointing from a sales standpoint and a good many people were beginning to wonder whether or not the business improvement that was prom-

ised following election last fall was going to materialize.

Now that doubt has gone. It has.

Doubtless the brightness of the sun, the opening of the golf courses and the thrill of a new baseball season are combining with actual sales increases to generate an optimistic outlook among executives. The psychological effect of sunshine in influencing the mental attitude of business men in a particular week or month is something that hasn't yet been sufficiently investigated. Often we feel that it has equal weight with the digestion factor, which everybody knows has a distinct bearing on how business condi-

tions look to a particular man at a particular time.

But even allowing for the natural exhilaration of mind and body that comes with the budding of the trees and the entrance of spring, there is little question that executives are not overconfident in their optimistic view of present automotive conditions.

It seems perfectly safe to let optimism loose because with it there appears to be a healthy tendency to watch the sales curve very closely and to avoid a possibility of overproduction in case the present upward movement should be decelerated within a month or so. There doesn't seem to be any tendency to build up extra plant facilities to meet what everybody admits may be only a temporary production short-

The Production Picture

"CURRENT prosperity in the retail market is reflected in the factory production schedules which are now in operation. March output was ahead of February by some 90,000, but April bids fair to outstrip any month in two years.

"If the factories keep on turning out cars as fast in the next two weeks as they have in the last two, the April total of cars and trucks will come very close to 400,000.

"That's a lot of automobiles. But—it shouldn't set the industry thinking again in terms of production records. Even with the present burst of speed, the total output for the year isn't likely to be very far ahead of 1924.

"There is a growing feeling that used car movements will tell the final story of profits this year for both manufacturers and dealers."

age. Instead, very definite attempts are being made to get greater output by rearrangement and greater drive of present equipment.

The situation on this score was well expressed by an executive of one large company last week, who, in answer to the question, "Are you producing at capacity today?" said:

"How do we know? We don't know what our capacity is yet, but from the looks of things we're going to find out pretty darned soon. We have several weeks' orders ahead and we are accelerating as fast as we can. We are surprising ourselves by the rate to which we are finding it possible to produce with our present equipment.

"We're finding new ways to save space, too. We've just increased our dynamometer test facilities very materially, for instance, without utilizing any more space than we did under the old layout—and we have had quite a good setup in the past, too."

Despite excellent sales conditions, however, competition continues to be very keen and every factory is keeping a close watch on its competitors, both from a sales and engineering standpoint. Nobody is too busy to keep one eye on his competitor's production curve and price schedules.

Parts Makers Not So Optimistic

The future of sales in 1925 isn't so firmly assured that anybody is forgetting about competition and devoting himself exclusively to finding new ways of stepping up production; and it is the general opinion that such a condition never again will be prevalent in the automotive industry.

Optimism among parts makers isn't so rampant as it is among vehicle builders. Parts executives express hearty satisfaction with the upward turn of business and some of them are just as enthusiastic as are the car makers. But enthusiasm in this field isn't nearly so universal. Most parts men are pleased with current conditions and report better volume and better profits than at this time last year. The capacity for building many units, however, still is so much greater than any demand likely to occur in the next twelve months that great enthusiasm just wouldn't be natural in many cases.

A definite effort to remedy this situation is being made by several companies which are looking for additional units to add to their lines. Their plan is to manufacture some parts which can be sold to the replacement market through jobbers, thus utilizing extra plant capacity and stabilizing production throughout the year. Considerable care is being exercised in selection of units for manufacture, however, and careful investigation of the marketing possibilities seems certain to precede any definite action.

Bus and Truck Are Helping

Several parts makers see the bus and truck business as the brightest spot on their horizon. Reasonable profits can be obtained on bus units more easily than on passenger car sales, although the volume is relatively low. The upward swing in bus demand is continuing steadily in general and is accelerating rapidly in certain sections. Already this market is a

very attractive one to certain parts makers and it bids fair to grow steadily in the next decade.

Current prosperity in the retail market is reflected in the factory production schedules now in operation. March output was ahead of February by some 90,000, but April bids fair to outstrip any month in two years. If the factories keep on turning out cars as fast in the next two weeks as they have in the last two, the April total of cars and trucks will come very close to 400,000.

There's a lot of automobiles. It's something to be pleased about because it really is a reflection of the retail market. But—

It shouldn't set the industry thinking again in terms of production records. Even if April output does run up to 400,000 the total for the first four months of this year will be about 179,000 behind the same four months in 1924. Which means—even with the present great burst of speed—that total output for this year isn't likely to be much more than equal to or a few hundred thousand ahead of last year.

Profits will be higher as the industry thinks of its output as a long saving affair and does not get too much excited about one or two big figures. Profits rest on economical operation during the entire year and into such operation a number of factors enter in 1925.

There is a growing feeling that used car movements will tell the final story of profits this year for both manufacturers and dealers. Talk about new car sales doesn't mean much unless the used car is spoken of in the same breath.

How does the used car situation stand today?

"Fairly good" is an answer which probably covers properly the situation as a whole. Such an answer naturally implies very good conditions in some sections and lines and rather poor conditions in others.

Last week in Detroit, for instance, three separate manufacturers told us about distributors who were calling on other distributors for used cars because they weren't able to fill all the orders for such cars that were coming in. The existence of even a few such cases is indicative of improvement in used car sales.

No Used Car Shortage

But even the most optimistic will not pretend that anything like a used car shortage exists generally even in small districts. Most of the more successful manufacturers, however, do report dealers' used car stocks as lower than at this time last year.

The used car situation inevitably improves when new car sales come easy. When demand is good, it means sales of automobiles—used as well as new. Moreover, dealers are not so much tempted to make wild trades when sales are coming easy.

Dealers in general are handling trade-ins and used car sales more intelligently than they were a year ago. There isn't much question about that. This fact is especially encouraging because, after all, the used car problem must be solved in the individual dealer establishment.

Improvement in used car methods can be attributed to a variety of causes, most of which can be lumped under the head of "increased attention to the prob-

lem." Manufacturers have been emphasizing the need for better used car methods and a number of them have devised specific plans for use by their dealer organizations. This general emphasis is beginning to have its effect.

The work of the National Automobile Dealers' Association along similar lines also deserves praise. The vice-president of one big car company gives the N. A. D. A. efforts credit for much of the progress that has been made, because, he says, a lot of dealers who wouldn't listen to the manufacturers did sit up and take notice when the ideas began to come from what they considered an unbiased source.

The used car seems likely to determine the degree of prosperity achieved by the automotive industry this year. The problem hasn't been licked yet. It bids fair to remain for some time as important a merchandising puzzle as any industry will have.

Aside from used cars, education of dealer salesmen is one of the things that is occupying the attention of manufacturers most. Work along this line ties in, of course, with education of the dealers themselves, but involves carrying factory effort one step further than has been common in the past.

A good many factory sales executives are convinced that the average dealer salesman is far from efficient; that he isn't even effective in many cases. There is a general impression that he wastes a good deal of time and that he often lacks sufficient knowledge of the product which he is selling. All retail salesmen aren't open to this charge, but a sufficient number fall down every year to make it worth while to spend some money trying to improve the situation. The president of one car company feels so strongly on the subject that he said last week, "Almost any amount of money within reason that may be spent in dealer education and in improving retail salesmen probably can be justified."

New departments, specially installed to handle work of this kind, are appearing in companies which never did anything definite in dealer education before. Those organizations which have been carrying on such activities now are expanding the work.

"Good dealers are harder to get today than ever before," says an important executive. "Competition for dealers is very keen. A good dealer really is nothing more than a good business man. The automobile industry has just as large a proportion of good

business men as any other. We've just been so close to our failures sometimes that we have often magnified their importance.

"That doesn't mean that we can let down on trying to improve," he went on. "On the contrary, greater activity in dealer education is needed more today than ever before. The future success or failure of more than one car manufacturer is going to be written in his dealer relations department."

Delivered car prices are getting attention today in more than one factory. The manufacturers always have been desirous of having cars put into the hands of the public at the lowest possible price and have not looked with favor on the rather large "handling charges" which have been tacked on by dealers in some cases. Everybody admits that the dealer is put to a certain expense in getting the car ready for sale after it has been delivered to him, but there isn't any general agreement so far as regards how much expense is involved in this work.

Some factories have maintained that the discount given the dealer was set with the expectation that it

should take care of handling charges. Others have admitted the need for extra allowance of some kind, but have disagreed with the dealers as regards the size of the charge. Some of the factories in the latter class have set a fixed sum for handling charges and do not permit their dealers to add anything more under such a guise. This system works well in proportion to the strength of the manufacturing company and the value of its franchise.

Even in the case of some of the stronger companies, dealers get around this fixed handling charge requirement by quoting a price for the car "completely equipped" and adding on additional handling charges in arriving at the total selling price.

There is much to be said on the side of the dealer, of course, because often the retailer has been asked

to put in condition for sale cars which were in bad shape when they reached him. Careless work at the factory has been paid for in dealer service stations on many occasions.

The question is an old one, but it seems to be getting renewed attention at the present time. There is a trend among the stronger companies to fix a handling charge and then try to make their dealers and distributors abide by it. What the final development will be nobody knows at present.

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"The used car situation inevitably improves when new car sales come easy. When demand is good, it means sales of used automobiles as well as new. Moreover, dealers aren't tempted to make wild trades when sales are brisk."

*The new Junior Eight*

New Locomobile Junior Eight Model Now in Production

Engine is overhead valve type employing high compression. Cylinders and crankcase a single casting. Lanchester vibration damper fitted. Rubber shock insulators. Four Body types.

By P. M. Heldt

OF the two new models exhibited by the Locomobile Co. at the New York show in January, the Junior Eight and the Junior Six, the latter will not be put in production, while the Eight has been changed in some important particulars. All details of the design of the eight have now been settled, however, and production on this model is under way.

The eight-in-line engine is of the small bore, overhead valve, high speed type. It has a bore of 2 13/16 in. and a stroke of 4 in., making the piston displacement 198.8 cu. in. At a speed of 3,000 r.p.m. it develops between 66 and 70 hp., which, in view of the moderate weight of the car, gives unusual speed and acceleration.

All of the cylinders and the greater part of the crankcase are in a single casting, while the cylinder heads form two castings. Compression spaces are machined to uniform size and are equal to 21 per cent of the total volume of the combustion chambers at the end of the inlet stroke. Plenty of water space is provided all around the cylinder barrels, as well as in the head, and the cylinder casting is well ribbed for stiffness. The fact that the casting extends a considerable distance below the crankshaft axis adds to the rigidity of the crankshaft bearing support.

Both the inlet and exhaust valves are made of Silchrome steel. In many recent designs, while material of this type is used for the exhaust valves, a different class of material is used for the inlets, but the Locomobile engineers consider the feature of interchangeability of sufficient importance to warrant the use of Silchrome for the inlets also. The valves have a clear diameter of 1 3/16 in. (about 65 per cent of the bore) and the lift is 5/16 in.

Operation of the valves is by tappet levers mounted on

a hollow tappet lever spindle, with adjustment screws at the pushrod end. The side rods extend up the side of the engine in two compartments cast in the cylinder block but closed by screwed-on cover plates. Cam followers are of the round nose type giving the same cam action as roller followers.

There are two cast aluminum valve covers over the cylinder heads, which are held in place by two thumb screws each. These have a comparatively narrow base, so that the spark plugs, which are located in the cylinder heads at a slight angle with the vertical, are outside the covers, as are also the bosses for the water return pipe.

Camshaft and accessories drive is by silent chain with the Link Belt Company's patented method of automatic tensioning. The drive is triangular, the chain passing over chain wheels on the crankshaft, camshaft and generator drive shaft.

Pistons of Cast Iron

The pistons are of cast iron and are held very light. They are fitted with four 1/8 in. rings with diagonal joints, all above the piston bosses, the lowermost ring being a Teetor oil control ring. The piston pins float in both the piston bosses and the top end of the rod. The connecting rods are the usual I section drop forgings.

The crankshaft is of the inherently balanced type, consisting of a four-cylinder crankshaft in the middle and a half of a four-cylinder crankshaft at either end. Individual sections of the crank are partially counter-balanced, and torsional vibration is guarded against by the use of Lanchester vibration damper. There are five main bearings, with two throws of the shaft between adjacent bear-

ings. These bearings are all $2\frac{1}{8}$ in. in diameter and the respective lengths (front to rear) are as follows: $1\frac{23}{32}$, $1\frac{3}{8}$, $1\frac{7}{8}$, $1\frac{3}{8}$ and $2\frac{15}{32}$ in. The crankpin bearings are $\frac{3}{4}$ in. in diameter and $1\frac{1}{2}$ in. long.

The engine is designed for four point support. Four feet are cast on the crankcase at its lower edge, those at the forward end resting on a frame cross member which also supports the radiator, while the rear feet rest on a special drop member. The oil pan is an aluminum casting.

Fuel is carried in a $16\frac{1}{2}$ gal. tank at the rear and is fed to the carbureter by means of a Stewart vacuum tank of the large size. The carbureter is the Stromberg, of $1\frac{1}{2}$ in. diameter. A combined inlet and exhaust manifold is used, of such design that the part of the inlet manifold directly above the carbureter flange is completely surrounded by an exhaust jacket. The exhaust manifold is of square cross section and is carried above the ports, while the inlet manifold has a round cross-section and is on a level with the ports. The exhaust pipe take-down is at the forward end.

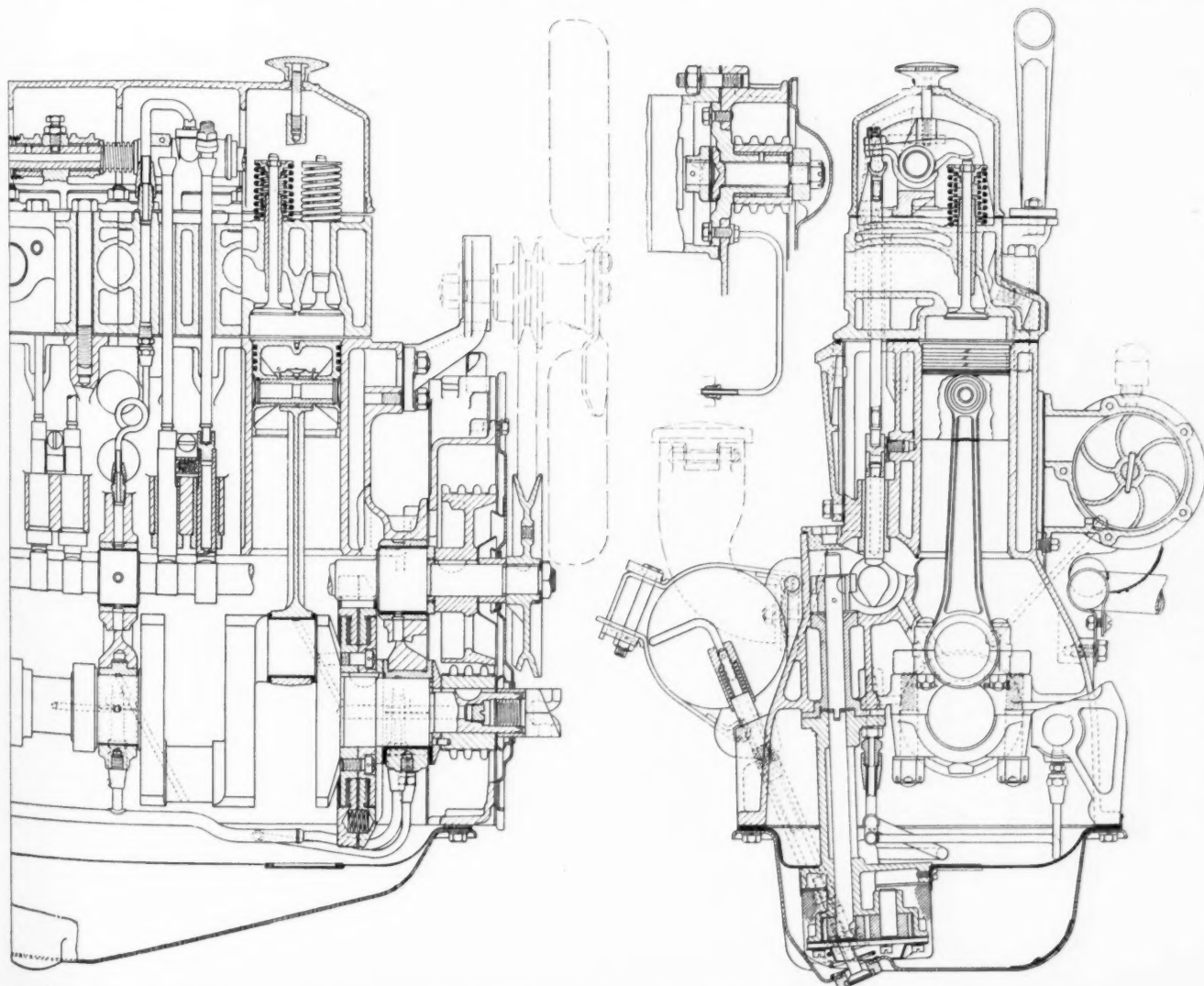
Lubrication is by pressure from a pump located in the oil sump and driven from the camshaft through helical gearing and a vertical shaft. A pressure relief valve is fitted directly to the pump. Oil is delivered through the hollow camshaft to each of the five camshaft bearings and thence to the main bearings, whence it passes to the crankpin bearings through passages drilled in the crankshaft. From the two inner camshaft bearings the oil passes up through tubes to the valve chamber on top of the engine, where it

enters the hollow valve rocker spindle through its supports and passes through drill holes in the rockers to its point of contact with the pushrod. Another lead supplies oil to the chain compartment at the front of the engine. A feature in connection with the lubrication system is that the oil can be drained from the crankcase by pressing on the stem of a poppet type drain valve which projects through the side of the crankcase in an accessible place.

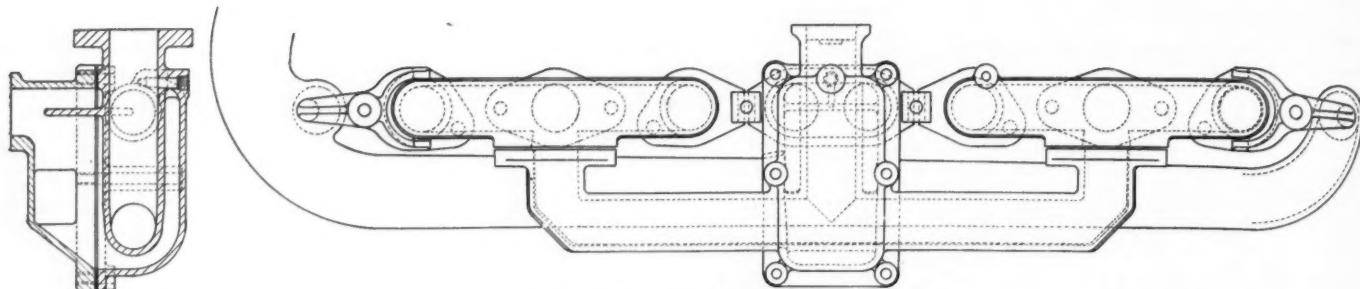
Centrifugal Water Pump

Pump circulation is employed for the cooling water, the centrifugal type of pump being bolted against the engine block about two-thirds the way back, its base serving as the inlet connection to the water jacket. The pump is driven through the generator, to the shaft to which it connects by means of a hose pipe type coupling. The radiator is a Fedders, of the cellular type, with $2\frac{1}{4}$ in. core and the usual pressed steel, nickered shell. Back of the radiator is mounted a 16 in. four bladed fan which is driven from the forward end of the camshaft through a V-belt. The return from the engine jacket to the radiator is through a brass manifold which has one connection to each of the two cylinder head castings. The spindle on which the fan revolves is clamped in a slotted bracket bolted to the front of the cylinder block, which affords means for adjusting the belt tension.

The electrical equipment, including the generator, starter and ignition unit, is of the DeJon make. The generator is mounted on the left side of the engine and



Sectional views of Junior Eight engine ($2\frac{13}{16}$ in. bore by 4 in. stroke)



Combined inlet and exhaust manifold

has the ignition unit mounted on it. Control of generator output is by the third brush system. Spark timing is partly automatic and partly by hand. The starter drives to the flywheel gear through a Bendix drive. The generator is 5 in. in diameter and the starter $4\frac{1}{2}$ in. The high tension cables from the distributor to the spark plugs are carried through a metal tube. A Clum combination lighting and ignition switch is mounted on the instrument board. The battery is of U. S. L. make and has a rated capacity of 85 ampere-hours.

Clutch Single Plate Type

The clutch is of the single plate type and is contained within the flywheel. It is held in engagement by the direct pressure of a set of coiled springs set in a circle, while disengagement is effected through the intermediary of multiplying levers acted on by the throw-out collar. The spinning weight of this clutch is very small and this greatly facilitates gear shifting. Another claim made for the clutch is that no amount of slipping in traffic can cause the driving disk to warp or fail to function.

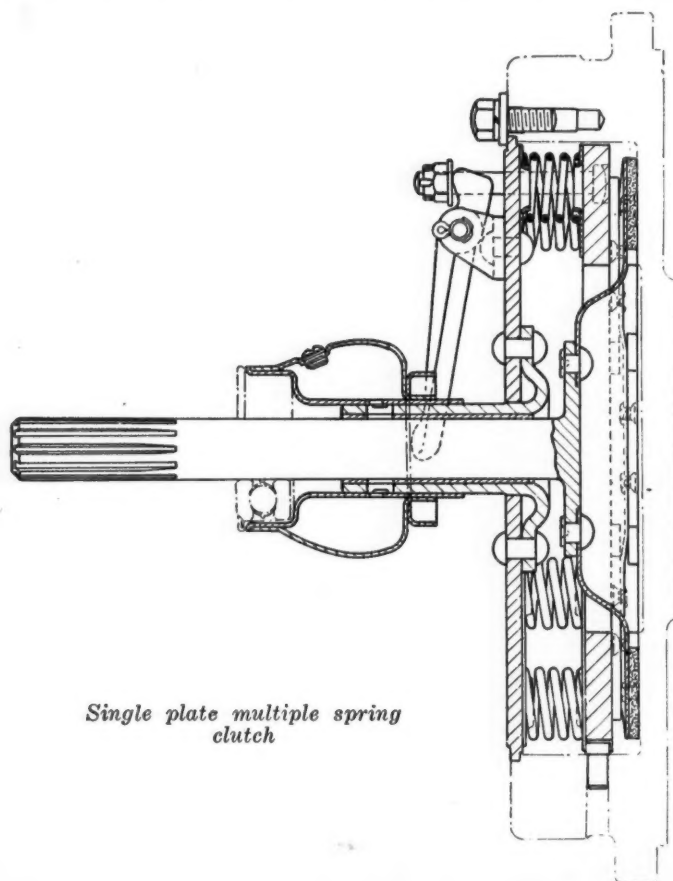
Between the clutch and transmission (which latter is mounted separately between two cross members of the frame) there is a double disk type of universal joint which, since it provides flexibility in all directions, relieves the

bearings of the engine and transmission of loads due to frame distortion. The transmission is a three speed and reverse combination, the ratios on the different gears being as follows: High, 1:1; intermediate, 1.77:1; low, 3.32:1; reverse, 4.2:1. The countershaft gear cluster is mounted on plain bearings while the primary shaft is mounted in ball bearings. All of the gears which are in mesh continuously, including the constant mesh set and the reverse gears, have ground teeth. The gearcase, which is of cast iron, is bolted against a deep cross member of the frame at the front.

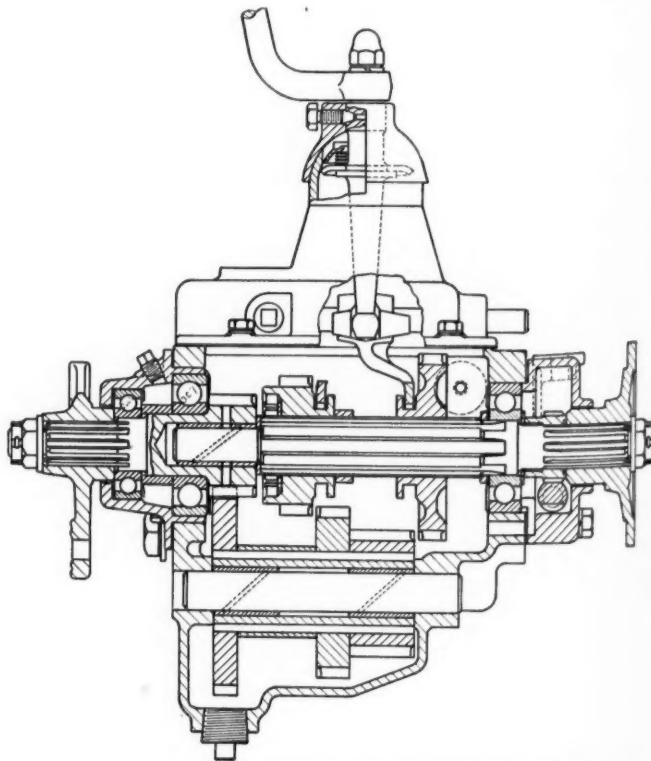
Power is transmitted to the rear axle through a tubular propeller shaft with two metal type universal joints. The rear axle is of the semi-floating, built-up type and the final drive is by spiral bevel gears. On the roadster a reduction ratio of $4\frac{7}{9}$ to 1 is used and on all other models a ratio of $5\frac{1}{9}$ to 1. The differential is of the two-pinion bevel type.

On the rear axle driving shafts taper roller bearings are used, both at the outer ends and on opposite sides of the differential, while the pinion shaft is mounted in two ball bearings and the pinion overhangs the bearings. Center housing and spring saddles are made of malleable castings, the housing being split in a vertical plane.

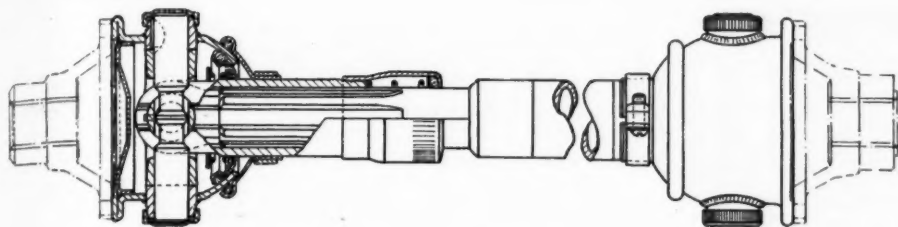
Perrot-Bendix four wheel mechanical brakes are standard equipment. These are of the three shoe type which give a servo effect, so that the application of the brakes



Single plate multiple spring clutch



Section of gearset (with ground teeth on constant mesh and reverse gears)

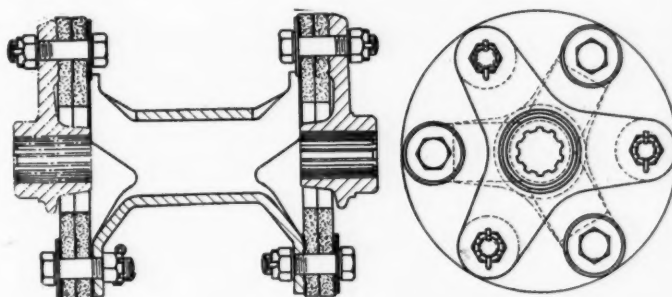


On left—Tubular propeller shaft with metal universals. Below.—Fabric type universal joint between engine and transmission

requires comparatively little effort. For service braking all four brakes are applied by the brake pedal, while for emergency use the rear brakes alone are applied by the lever. When the brakes are applied by the pedal they are equalized in pairs, but the hand lever attacks the mechanism of the two rear brakes positively so that even in the case of the breakage of a rod it would be possible to apply braking force to one wheel. The brake lever, by the way, is located at the left of the driver's seat and not in the middle of the compartment. The brake drums have an internal diameter of 11 5/8 in. and there is an active drum area of 64.18 sq. in. at each wheel, while the surface area of the shoes which are 1 3/4 in. wide is 58.4 sq. in.

The frame comprises side members of 5/32 in. stock, 6 in. deep and with 1 3/4 in. flanges. There are cross members at the front and rear of the engine, at the front and rear of the transmission, at the forward end of the rear spring and in addition the fuel tank guard at the rear which is made of heavy stock and adds materially to the rigidity of the frame. Semi-elliptic springs are used all around and are provided with the Mack rubber shock insulator, this constituting apparently the first application of these devices to private passenger cars. The front springs are 36 1/2 by 2 in. and the rear springs 54 1/2 by 2 in. The rear springs are underslung and they take both the driving thrust and the torque reaction, the so-called Hotchkiss drive being used.

The front axle is of the usual drop forge type with inverted Elliott type steering heads. Steering spindles are set at such an angle that the axis of the spindle bolt produced comes to within 3/4 in. of the center point of tire contact on the ground. A Ross-Warner steering gear is used with a mahogany finish all wood wheel, 17 in. in diameter. Two and one-half turns of the steering wheel



throws the road wheels from hard over one way to hard over the other way. Spark and throttle controls are of the Warner friction type.

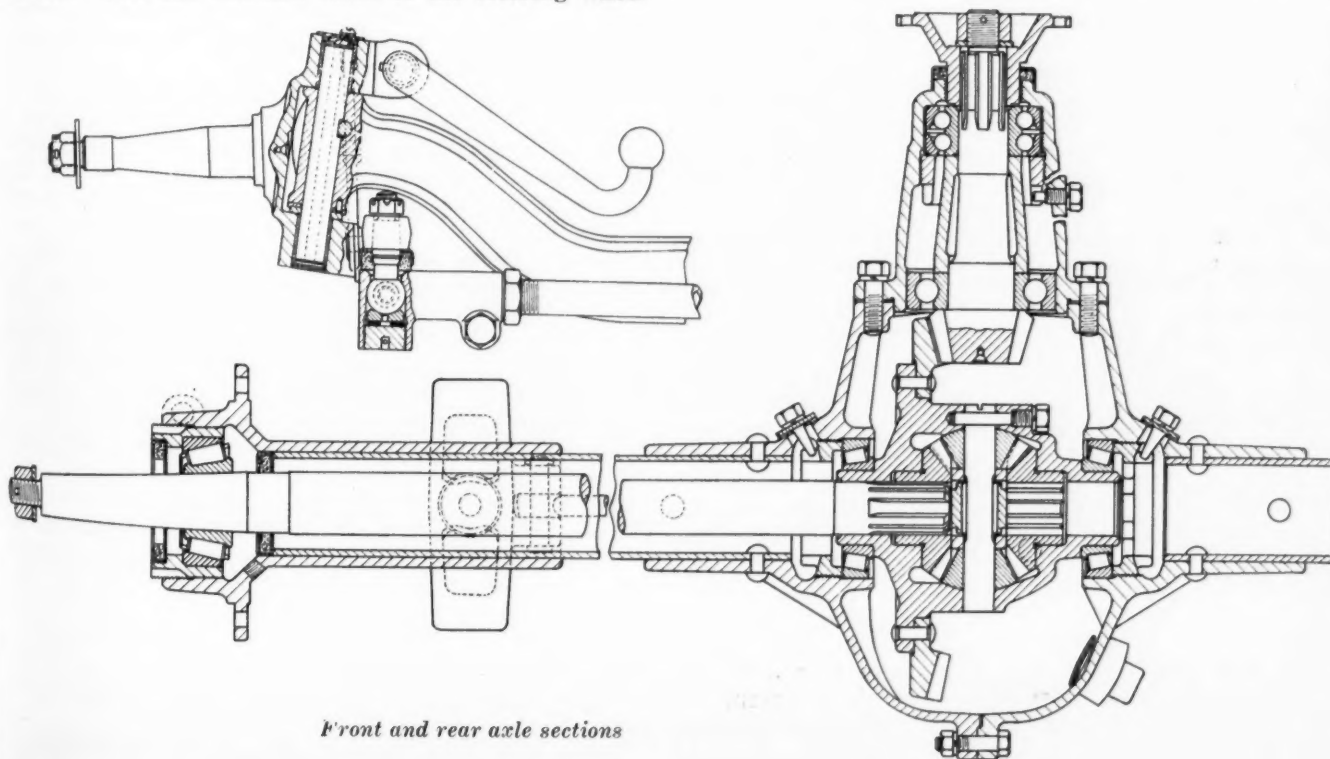
Artillery type wheels are fitted, finished in the natural wood and equipped with 30 by 5.77 in. balloon tires with all weather tread. The wheelbase of the car is 124 in. and the tread 57 in.

Standard equipment includes a motor-driven horn, windshield wiper, snubbers, curtains and a complete set of tools.

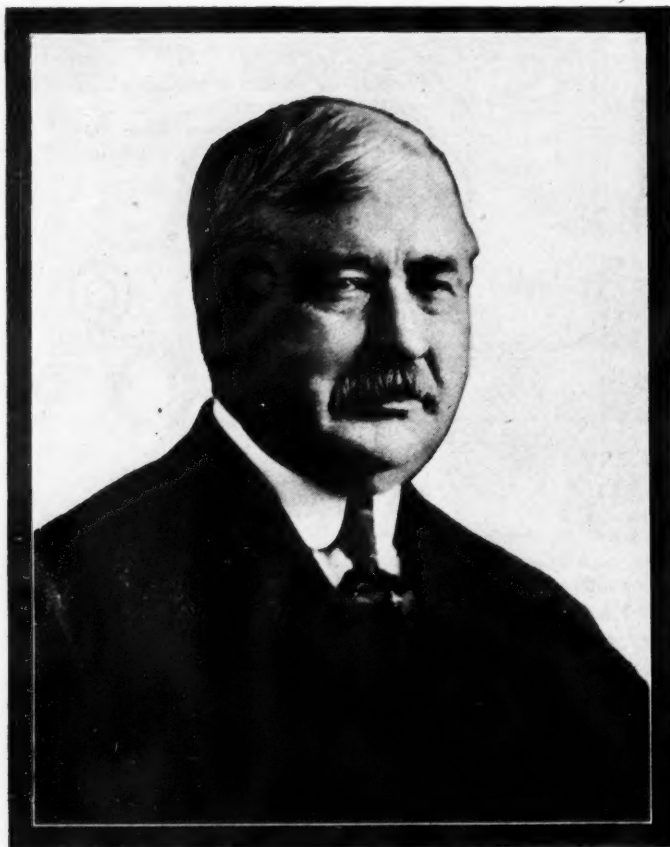
The car will be turned out in two open and two closed models, which are priced as follows: Touring, \$1,785; roadster, \$2,150; sedan, \$2,185; brougham, \$2,285.

The bodies are of wood-frame, steel-shell construction. The closed models are fitted with the Rawlins automatic window lift. All bodies are quite roomy and have deep seats, well inclined for comfort. Young springs and Weise & Co. special trim are used, the style of upholstery being what is known as plain French pleat.

A single piece fixed type of windshield is used on the closed models and a single piece movable type on the open.



Front and rear axle sections



ELWOOD G. HAYNES, one of the most prominent of that small group of men who laid the cornerstones of the automotive industry, died of pneumonia at his home in Kokomo, Ind., on April 13. He had been critically ill for several days. He was 67 years old.

Mr. Haynes left behind him a heritage of constructive achievement which has been equalled by few inventors or industrial leaders and his passing is sincerely mourned by the industry he helped to build.

On July 4, 1894, together with Elmer and Edgar Apperson, he tested his first horseless vehicle—the vehicle which later was to bring him fame. Mr. Haynes at that early date had a vision of what the automobile might be in the future; what it might mean to transportation; and what it might do for the people of this country. And he had confidence in his vision. He backed it up with money and effort, leaving the gas and oil business to devote his life to perfecting and promoting this new form of transportation.

In 1898 he organized a company for the manufacture of the vehicle which he had developed in conjunction with the Apperson brothers, and until 1902 was head of the Haynes-Apperson Co. He lived to see that first snorting, struggling vehicle transformed into a smoothly operating, efficient mechanism and to see the small industry which he helped to found grow into the second largest manufacturing business in the United States.

While famous chiefly as the builder of one of the first successful gasoline propelled vehicles in the United States, Mr. Haynes has to his credit many other notable achievements in metallurgy and engineering. In 1906 he invented stellite, an alloy of nickel, cobalt and chromium, for use in table and pocket knives, and in 1907 obtained a basic patent on the material. In 1912 he further improved stellite so that it became useful for high speed metal-cutting tools, and, in the same year, invented a grade of stainless steel. Thus he added to his achievement in motor vehicle design a notable contribution to means for producing such vehicles in quantity.

Industry Mourns the Passing of Elwood Haynes

*Famous figure in the automotive world
leaves heritage of achievement
equalled by few men*

Mr. Haynes' first car now is the property of the Smithsonian Institution in Washington, D. C. This first vehicle weighed 820 lb. and was capable of a speed of 8 miles an hour. It could run for an hour without stopping. It was built largely from parts originally designed for other work but which served to demonstrate the feasibility of propelling road vehicles by internal combustion engines. The engine was a Sintz two-cycle marine engine with a single cylinder, the wheels were bicycle wheels and the body was a buggy body.

The tests made with this vehicle proved so encouraging that Mr. Haynes, in partnership with the Apperson brothers, went ahead and designed a new vehicle from the ground up, including the engine, which was a two-cylinder horizontal opposed type, and the transmission, which was of the geared type with a separate friction clutch for each gear, but all of the clutches operated by the same lever. The earlier cars had all of the propelling machinery on a frame connecting the two axles, but before many had been built the machinery supporting frame was suspended on springs.

Ordered Off the Streets

Mr. Haynes was ordered off the streets of Chicago with his car in 1895. Reminiscing about the incident a few years ago, Mr. Haynes said:

"I remember very well when the little machine was unloaded for a newspaper contest in 1895 at Englewood, a Chicago suburb. I was riding down Michigan Avenue, intending to drive to the central portion of the city, and had proceeded only six or eight blocks when I was accosted by a policeman and ordered to leave the boulevard at once, as nothing like horseless carriages were permitted on that thoroughfare. I remonstrated with him, urging that the machine couldn't do any harm to the boulevard since it was equipped with rubber tires and made relatively little noise. He simply replied that it was 'Orders, sir,' so I could do nothing but comply."

The Haynes cars always made good showings in the endurance runs which were frequent events in the early days of the industry.

Mr. Haynes was born at Portland, Ind., Oct. 14, 1857. He was graduated from Worcester Polytechnic Institute in 1881, having invented an apparatus for making oxygen previous to that time. His college thesis was on "The Effect of Tungsten on Iron and Steel."

He started his career as principal of the Portland (Ind.) High School, remaining in that position for two years. Then he entered Johns Hopkins University for a post graduate course in chemistry and biology.

When he finished there in 1884 he became manager of

the Portland Natural Gas & Oil Co. in the town of his birth and three years later, in 1887, conceived the idea of a "horseless carriage." Between the time of the conception and the completion of the first car, in 1893, he invented a small vapor thermostat and worked as field superintendent of the Indiana Natural Gas & Oil Co., his headquarters being at Greentown, Ind.

Mr. Haynes is credited with having introduced the use of aluminum in automobile engine construction in 1895, the same year in which he won a \$150 prize for the best balanced engine in the Chicago *Times-Herald* contest.

In 1899 he made the first 1000 mile automobile trip in the United States, driving from Kokomo to New York City in ten days' actual running time, and in 1905 invented and built a rotary valve gas engine. In 1904 the Haynes-Apperson Co. was awarded a Grand Prize at the St. Louis World's Fair.

After the breaking up of the Haynes-Apperson Co. in 1902, Mr. Haynes became president of the Haynes Automobile Co. of Kokomo, a position which he held until the time of his death, although he relinquished active management of the organization some time ago.

Throughout his life Mr. Haynes was closely identified with his native State of Indiana, practically all of his business as well as his early years having been spent there, despite the fact that he traveled widely from time to time.

Monument in His Honor

On July 4, 1922, a celebration was held on Pumpkinvine Pike, near Kokomo, to mark the unveiling of a monument to Mr. Haynes. This monument was made of Stellite and was erected at the point where Mr. Haynes' first car completed its test run. More than 7000 people assembled to honor Mr. Haynes on that occasion and a message of congratulation was sent by President Warren G. Harding.

Mr. Haynes' last public appearance before the industry was on Jan. 7, 1925, when, with ten other pioneers of the automotive industry, he was presented with a gold medal at the annual banquet of the National Automobile Chamber of Commerce. The other men who were decorated at the same time included Edgar Apperson and J. D. Maxwell, two of the three men in addition to Mr. Haynes who were present at the first trial of the original Haynes car. Other



The First Haynes Car

The above is a picture of the original Haynes automobile, constructed in 1893 and tested in 1894. The car is now a permanent exhibit in the Smithsonian Institute at Washington, D. C.

pioneers also decorated at that time were R. E. Olds, A. L. Riker, John S. Clarke, Rollin H. White, H. H. Franklin, Charles E. Duryea, Charles B. King and Alexander Winton.

It is said that Mr. Haynes was working on the development of a new automotive steel at the time of his death.

Mr. Haynes was active in many automotive organizations throughout his life. He was one of the leaders in the movement responsible for the organization of the American Motor League in 1895. This was the first body ever formed for the systematic advancement of the automotive industry in America. Its purpose was outlined as "The promotion of the interests and the use of motor vehicles . . . by reports and discussion of the mechanical features, by education and agitation, by directing and correcting legislation, by mutual defense of the rights of said vehicles, etc."

He was a member of the Society of Automotive Engineers, of the Iron and Steel Institute of Great Britain, the American Chemical Society, the International Congress of Applied Chemistry, the American Institute of Metals, the Chicago Automobile Club, the Hoosier Automobile Club, the Old Timers' Club, and the Automobile Legal Association.

The Haynes Automobile Co. has undergone several reorganizations in recent years. Its production over the period from 1914 to 1924 averaged about 4200 cars per year. Its biggest year was 1916, when approximately 6500 units were built. Its total output for the ten years ending Dec. 31, 1924, was about 45,000 vehicles.

During the past year, financial difficulties caused bankruptcy proceedings to be instituted against the company. It was declared bankrupt Oct. 22, 1924, by U. S. District Judge A. B. Anderson, at Indianapolis. Liabilities were listed at \$3,619,000 and assets at \$1,684,000.

Last February, at auction, a committee representing the company's bondholders bought in the property, including plant, goodwill and name, for \$875,000. The committee also paid \$125,000 for the inventory of stock. At the time of the purchase it was stated that the bondholders would reorganize the company and resume production. They are still working on the reorganization plans. In the meantime only the service department is operating.

The Haynes car appeared at the National Automobile Show in New York last January. It was not, however, exhibited at the 1925 Chicago show.



Mr. Haynes in a characteristic speaking pose. Picture taken during an address at ceremonies attending the erection of a tablet in his honor, July 4, 1922, on the Pumpkinvine Pike, Indiana.

Chemists Seek Answer to Question, "What Is Detonation?"

Conclusion reached at recent meeting of A. C. S. was that definite information on subject is lacking. Turbulence as a factor affecting the nature of gaseous combustion.

By A. Ludlow Clayden

AN inquiry into the subject of detonation was one of the features of the recent meeting of the American Chemical Society. The question was introduced for discussion in the section on gas and fuel chemistry.

Broadly speaking, the conclusion reached was that, scientifically, our ignorance as to what detonation really is, and what causes it, is almost complete.

The discussion was stimulated principally by Thomas J. Midgley, Jr., who urged the members of the society to turn their attention to turbulence as the factor most vitally affecting the nature of gaseous combustion.

He pointed out that experiments conducted upon quiescent gases, either in bombs or in long tubes, while undoubtedly valuable in adding to our knowledge of the nature of combustion, could not possibly be applied directly to the reactions within an engine because of the great effect of turbulence which was always present in an engine cylinder.

Probably the most general idea as to the effect of turbulence is that it assists combustion by a better mechanical mixing of the vapors. This, it seems, is scarcely an adequate explanation, as it is known that molecular movements are vastly more rapid than any possible turbulence movements.

Obviously a great deal more experimental data must be obtained before the turbulence theory can be greatly advanced. A study of the subject does not appear to present any greater difficulties that have already been overcome in observations of combustion, and many of the universities are well equipped to carry on the work.

Spread of Combustion

It was pointed out that it seemed almost certain that combustion in an engine is spread from the ignition point over the surface of the metal, since this is in accord with what is known to take place in other forms of gaseous combustion. For this reason the nature of the metal surfaces is almost certainly a factor in the nature of the combustion, and coating the cylinder head with catalysts, as is done in the Sokal treatment would necessarily have some effect upon the combustion.

In this connection, sufficient is known for it to seem reasonable that the Sokal treatment should enable slightly weaker mixtures to be used. Lacking any real knowledge as to what detonation is, the effect of a catalysis, either on the metal surfaces or within the gases themselves, cannot be logically predicted.

Perhaps the most interesting thing of all arising from this discussion is that the chemists are becoming extremely interested in the subject and are conducting a great variety of researches, all of which are furnishing data which are helping us toward a much better understanding of the subject. Appreciation of the practical

importance, as distinct from purely scientific interest, was very marked.

The petroleum section of the meeting devoted its attention mainly to matters of interest to refiners and thus the papers had only an extremely indirect bearing on the automobile. One paper, however, by A. E. Flower, F. H. McBerty and Ronald Reamer, dealt with the constantly recurring subject of reclamation of used automobile oils.

Equipment Is Described

Mr. Reamer, who read the paper, described an equipment which had been developed to a commercial point, which it was considered, might find a sphere of usefulness in plants where large quantities of crankcase oils were ordinarily handled. The apparatus consists of a De Laval separator for the removal of solids, and a washing chamber in which the oil is mixed with alkali to facilitate the removal of solid impurities, and also a closed chamber or tower down which the oil is slowly flowed and up which rises a column of highly heated air for the removal of dilution.

This equipment as described was built as a complete unit with electric heating, so that the only connections required in operating it would be wiring to the heater and the motor.

Discussion of the paper largely centered upon how much dilution was ordinarily found and what proportion of it it was found necessary to remove. On this there appeared to be a wide divergence of opinion.

The apparatus described operates continuously and is claimed to require very little attention. In the size described it would treat a barrel of oil in from eight to twelve hours, according to the amount of dilution which it was desired to remove. Mr. Reamer showed specifications of oils before and after treatment, showing that it was possible to recover most of the characteristics of the new oil excepting the Conradson carbon residue, which was invariably higher.

This raised the point as to whether the Conradson carbon test was really an indicator of the amount of carbon formation which would occur in an engine. Several of the members who had done much experimenting on this point stated that they found the connection to be almost a direct one, and that low Conradson carbon was unquestionably a desirable feature in a motor oil.

THE French Government is at present considering a new customs tariff. Duties on motor cars are scheduled at from 600 to 1200 francs per 100 kilograms or \$14.50-\$29.00 per 100 lbs. On the lowest priced American car this will amount to from almost 100 to 200 per cent ad valorem, while on a 4000 lb. car selling at \$3,000 it amounts to from 19 to 38 per cent ad valorem.

Just Among Ourselves

Good Rumors Getting Scarce

WE were a little disappointed with our trip to Detroit last week because we didn't hear so many good rumors as we had expected. As far as the rumor situation is concerned we might better have stayed home, because New York has been furnishing us with rumors on a real quantity production basis for several weeks. Take the merger question, for example. People in Detroit seem to be so busy denying rumors started in New York that they haven't had a fair chance lately to maintain their own high output.

Parts Makers Seek New Lines

NEWS of new models in prominent lines did reach our ears, however, but nothing worth getting excited about for nearly a year. Parts companies are looking for new lines of parts and accessories to manufacture in order to take up the slack in their plant capacity. A unit which can be sold to the public through the jobber-dealer channels seems to be preferred. Something new in brakes within the next couple of months wouldn't surprise us.

Cost Reduction Now Slow Process

WE'VE been saying for a long time that major cost reductions couldn't be expected from production departments any more. The president of a company making a high-priced car confirmed that idea last week with the statement that "if we find a way to cut 6 cents off the price of a car we go out and wave a flag. We congratulate ourselves when we knock off 1 or 2 cents." The assertion was made in pointing out that car price reductions hardly could be justified on the basis of any man-

ufacturing economies at this time, despite the fact that production costs are slightly lower than at this time last year.

Sales Promotion Among Dealers

NEARLY every factory has a sales promotion man at work today. Many of them are expanding their dealer education work. Even the retail salesman is coming in for factory attention. But most of the factory work has to be done by mail in one way or another. The cost of personal dealer contact would be very great. Mail efforts of this kind can be effective only if backed up by constant interpretation and urging. If every distributor or branch had one man whose sole job consisted in traveling among dealers and helping them with their problems, the factory educational work might be made much more effective than is sometimes the case at present. Questions as to the cost of such promotion work will arise immediately, of course, and in the end would be the determining factor as to the feasibility of the idea.

Making Motoring Unpleasant

THE Maryland motor vehicle authorities have just staged a remarkable exhibition of "How to Make Motoring Unpleasant." Refusing to recognize temporary Florida licenses, they stopped several hundred motorists returning from the South last week and forced them to pay \$10 for Maryland plates. The motorists were allowed to pass through Baltimore and as far as Belair, 55 miles from the State's southern boundary before being stopped. Maryland license tags were not available at the place where the motorists were stopped, so they had to go back to Baltimore either by bus or by train. Several families, it is said,

had to stay in a field overnight, since no hotel accommodations were available nearby. Can you beat it? To our mind, the comment made by William L. Dill, New Jersey Motor Vehicle Commissioner, indicates how any sane administrator might be expected to view such a situation. "Maryland is clearly within its rights," Dill is quoted as saying, "but New Jersey's hesitancy in acting is due to a desire to facilitate the homeward trip of the motorists, who undoubtedly are confronted with many difficulties in trying to obtain registration from home States by mail."

Science to the Aid of Industry

AS usual, the automobile industry has been quick to put into commercial application the latest developments of modern science. Auburn recently telegraphed photographs of its new models from Chicago to Los Angeles so that illustrative material might be used in a conference of dealers which was in progress in the Western city. Maybe we can look forward to the day when dealer conferences will be held by radio with pictures of new cars and parts going through the air alongside of sales talks.

Subways Make Good Parking Space

HERE'S one told by W. K. Towers of Paige-Detroit at annual banquet of the Automotive Service Association of N. Y. the other day. It is said that plans for a new Detroit subway were shown to Henry Ford for his approval a few months ago. "When do you expect to lay the tracks?" Ford asked. "In about four years," was the reply. "That's all right, then," Ford came back; "by that time you will be running ramps into the subway and using it for parking space." N. G. S.

New Holley Vaporizer Permits Use of Any Grade of Fuel

Benzol, gasoline, kerosene and coarse, heavy oils give the same results. Claimed to reduce time-lag to a minimum and to effect fuel economy. Used on Fordson tractors.

By W. L. Carver

UNUSUAL flexibility and economy of operation are the outstanding characteristics of the fuel vaporizer which has been developed by the Holley Carbureter Company. This device now is being shipped on Fordson tractors and is capable of handling the whole range of fuel oils from benzol and gasoline down through kerosene to the very heavy fuels, such as the black oil commonly used in Borneo.

During the development period preceding the formal announcement, runs under various actual field conditions have been made with the tank filled with waste crankcase lubricant. Even with this unusual fuel, little or no smoke showed at the exhaust and the engine had the flexibility of gasoline operation.

In operation two outstanding features have been developed. First, the device works equally well on any of the range of fuels mentioned above. Second, fuel economy follows theoretical lines and is equally good for the heavier fuels. In view of the first consideration, the new vaporizer is not recognized as a purely kerosene instrument, but as a more efficient vaporizer for the whole range of available fuels. This characteristic is responsible for the second feature.

Theoretically, a gallon of kerosene should produce more power in an internal combustion engine than an equal amount of gasoline. Heretofore engineers have been compelled to overlook this point when making the compromises in equipment for burning kerosene or other heavy fuels. However, the facilities for vaporizing the

heavier particles of fuel in this instrument are sufficiently thorough to have eliminated this difficulty. Furthermore, the element of time-lag has been reduced to a minimum, so that with the improved economy the demand for flexibility and ease of starting has been satisfied. In the minds of those who have experimented with heavier fuels this will represent a real advance, as heretofore one of the factors of fuel economy, full load capacity and flexibility had to be slighted to some extent to achieve a commercial compromise.

Heat Applied to Rich Mixture

Exhaust heat is applied to a very rich mixture which is diluted with the incoming air stream at a throat or venturi situated just ahead of the throttle valve. The heating chamber is formed by two steel stampings of 1/32 in. thickness. Therefore the time-lag, as referred to, transmitting the heat of the exhaust to the rich portion of the mixture, is very slight. In fact, but one float chamber full of gasoline is required to produce the necessary heat conditions when the engine is started cold.

Like all devices of this kind, some tendency toward carbon collection may exist in the heating chamber. In this case this unit can be cleaned thoroughly after removing four capscrews and a coverplate without disturbing any other portion of the device.

As illustrated by Figs. 1 and 2, a combined intake and exhaust manifold of cast iron is the foundation of the

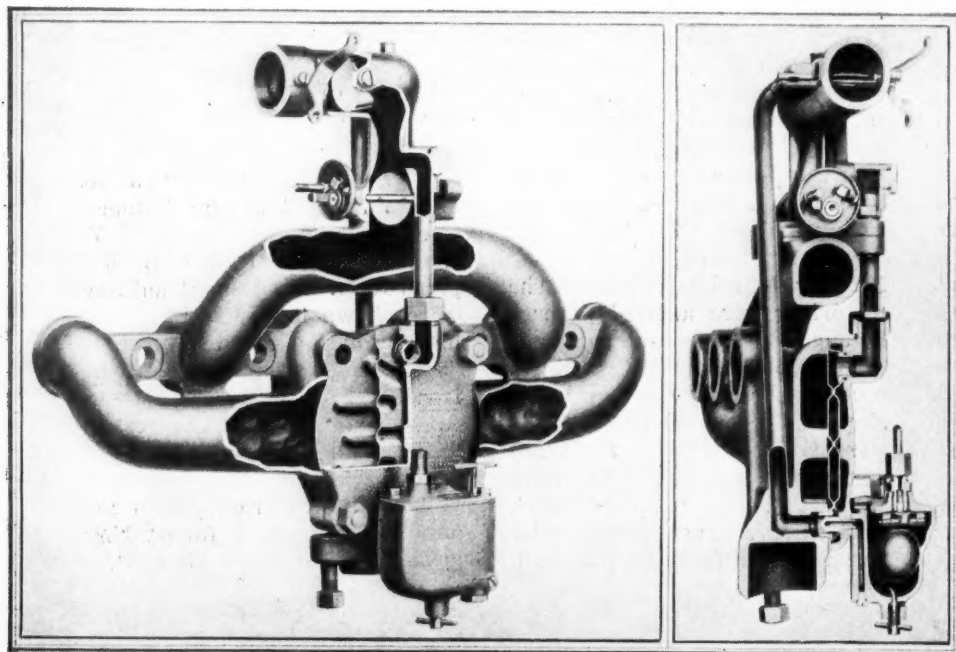


Fig. 1 (left)—Side view of new Holley vaporizer. Cut-away sections indicate construction of heating chamber, auxiliary air valve and throttle

Fig. 2 (right)—Cross section of float chamber, fuel jet and heating chamber showing steel plate construction of latter

whole device. The intake portion, of ramshorn design, is located above the exhaust portion, which has its outlet at the bottom of an enlarged middle section. The float chamber, with inverted float valve, is located near the bottom and is secured to the cover of the heating chamber. A brass plug, which is screwed into the heating chamber cover, also secures the outer steel jacket of the heating chamber and forms the fuel jet. In order to emulsify the rich mixture a steel tube which connects with the primary air intake introduces air at the jet. This connection is made to bring all of the air in through the air washer, which is connected with the air intake by a short tube. As shown at the top of Fig. 2, the bypass to the fuel jet is throttled by a valve formed at the end of the stem of the choke valve. In starting, this valve is nearly closed. Therefore a restriction is placed on both the main and bypass air streams with an added effect on the latter. This arrangement insures a rich though emulsified mixture for starting.

Heating Chamber Construction

From the throat around the fuel jet the mixture passes upward into the heating chamber which is formed by clamping two steel stampings together. On each of these stampings ribs are formed in a symmetrical manner. When the two stampings are pulled together by the cap-screws at the cover, the opposing ribs, as well as the edges, are held together. Thus two small tortuous passages through the heating chamber are formed as indicated by Fig. 1. As the inner steel plate is in direct contact with the hot exhaust gases, the temperature of the rich mixture is raised to a high point and thorough vaporization ensues.

At the top of the heating chamber the hot mixture passes out through a short tube into the throat above the throttle valve. Tests made with a glass tube at this point demonstrate that a dry gas is produced in the heating chamber. Here the mixture with the primary air is made. This air stream is regulated by an auxiliary valve in the intake passage. A brass forging which is used is made with a heavy bob below the horizontal bearing and therefore affects the vacuum in the balance of the instrument, due to the work required to open this unbalanced valve. The usual butterfly valve is located just above the intersection of the vertical portion and the branches of the manifold, and a priming cap is placed on top of the elbow at the upper end of the vertical section. A mounting flange for governor installation is located at the front end of the throttle stem, while the connection for hand control is shown at the rear.

Assembly Fits Fordsons

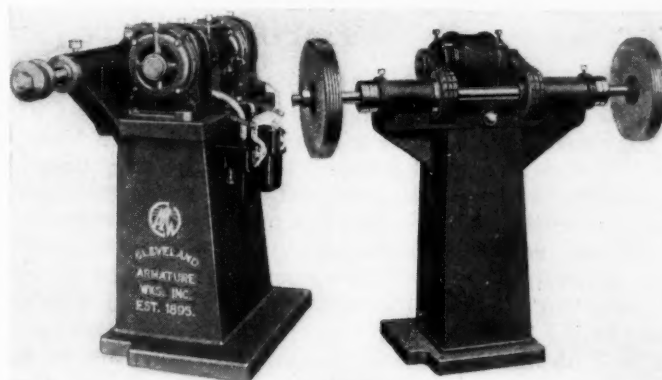
As shown here, the complete assembly fits all Fordson tractors. In conjunction with the vaporizer, a two compartment tank is used. In the larger portion kerosene or other heavy fuel is carried with gasoline for starting in the smaller, which has a capacity of approximately one gallon. A three-way valve controls the outlets of both compartments. Just before finishing the day's work this valve is shifted to the gasoline position and the engine is allowed to run long enough to fill the float chamber with this fuel. This amount is sufficient to set up the proper heat conditions for operation on heavy fuel, so the operator shifts the valve back to the heavy fuel as soon as the engine fires.

As explained previously, occasional cleaning may be required. To perform this operation the nut shown at the bottom of the vertical tube in Fig. 1 is backed off and the four cap screws are taken out. The outer plate of the heating chamber comes off with the cover plate,

leaving the inner plate exposed. Only this plate requires cleaning and this is done easily with a cloth.

In connection with the stamped heating chamber, a lug is placed inside of the cover plate to hold the projections on the two members together firmly at all points. The entire unit is secured to the cylinder block by studs and nuts at four bars which join the intake and exhaust openings.

New Buffing and Polishing Machines Are Chain Driven



(Right) C. A. W. heavy duty single spindle buffer and polisher

(Left) C. A. W. extra heavy duty double ended buffing and polishing machine

TWO new designs of buffing and polishing machines are announced by the Cleveland Armature Works, Cleveland, Ohio. One is an extra heavy duty double spindle and the other a heavy duty single spindle machine, both having chain drive from motors which are located close to the spindles. Any desirable spindle speed can be obtained with alternating current motors of either 25 or 60 cycles. These machines represent quite a departure in established practice in this line, which consists in the use of short, high speed belts, and are claimed to effect a material increase in efficiency.

In the extra heavy duty machine a single casting forms the motor base, central chain box and spindle housings. Special motors with flanges and shells are bolted to opposite sides of the chain box, their shafts projecting into the box through slotted openings, so the motors can be moved back to take up slack in the chains. The drive is through silent chains running on hardened steel sprockets. A supply of 2 gal. of heavy oil is kept in the chain box, and oil slingers on the motor shafts dip into the oil and keep the chains and sprockets constantly bathed in oil.

Chrome nickel steel shafts are used and are mounted in taper roller bearings which can be adjusted from the outside. Each spindle is provided with a shaft lock to hold it rigidly while changing wheels. The two ends of the machine are absolutely independent of each other. Each motor is controlled by an oil circuit breaker conveniently located. Bearing lubrication is by compression grease cups.

This machine is made in four standard sizes, with overall spindle lengths of 45, 58, 60 and 70 in. Weights range between 1500 and 2000 lb. and powers of the individual motors between 2 and 6 hp.

The heavy duty buffer and polisher has a single motor which drives by multiple chains (one each horsepower), leather faced and running in deep V grooves on pulleys. This machine is made in two frame sizes with overall spindle lengths of 48 and 60 in. and in 2, 4, 6 and 7½ hp. sizes, weights ranging from 1200 to 1500 lb.

Eight-Wheeled Bus with Gas-Electric Drive Is Developed

Experimental chassis of Versare Corporation has two four-wheeled trucks. Knuckle and fifth wheel steering are combined.

Engine develops full power at low bus speed.

AN eight-wheeled experimental bus chassis with gas-electric drive has been built by the Versare Corporation of Albany, N. Y., and may possibly prove the forerunner of a special class of vehicle created to cope with increasing loads in motor transportation.

There are several obvious advantages in an eight-wheeled vehicle with a frame suspended on eight springs. Greater loads can be carried and at the same time the weight per inch of tire width reduced. Shocks due to the impact of the wheels with road obstructions are of less intensity, and both the pounding effect on the road and the stresses on the chassis and body due to road shock are materially reduced. This, evidently, means longer life of all parts thus affected.

That the eight-wheeled vehicle did not make its appearance sooner is believed to be due to the fact that the problem of properly laying out the steering mechanism for such a vehicle had not been solved.

An eight-wheeled vehicle is necessarily of very considerable length, yet it must be capable of being maneuvered in narrow streets and on winding roads. This, therefore, was the first problem attacked by the Versare Corporation. The initial eight-wheel bus was fitted with a steering mechanism which made it possible to handle the vehicle in all places usually traveled by conventional four-wheeled vehicles.

The bus can be turned around in a circle of a diameter a little greater than the length of a vehicle. To fully appreciate what this means it must be stated that the overall length is 36 ft. The bus has 33-in. wheels fitted with solid rubber tires. The chassis frame is mounted on two four-wheeled trucks, each with a wheel-

base of 54 in. The distance between the centers of these trucks is 27 ft.

Completely equipped this experimental vehicle weighs 22,850 lb. This is quite heavy for a vehicle of this type, but it is explained that the great weight was due chiefly to the heavy frame construction, which was designed for test purposes. The tread is 61 in. and the truck body width 8 ft., which latter is the maximum allowed by law.

In steering, the front wheels of the forward truck are turned by the driver in much the same way as on ordinary four-wheeled vehicles. The steering post is connected through gears and levers to a small wheel which

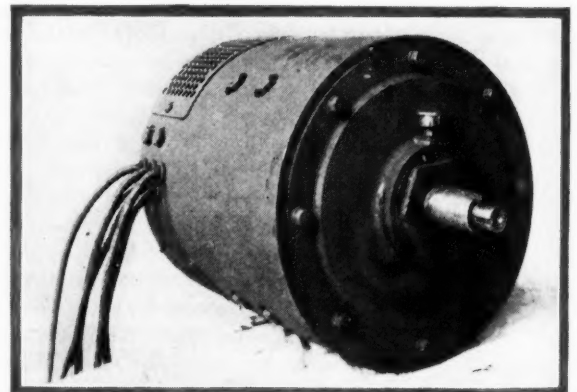


Fig. 2—Westinghouse vehicle type motor (rating, 20 hp., 130 amps. at 176 volts)

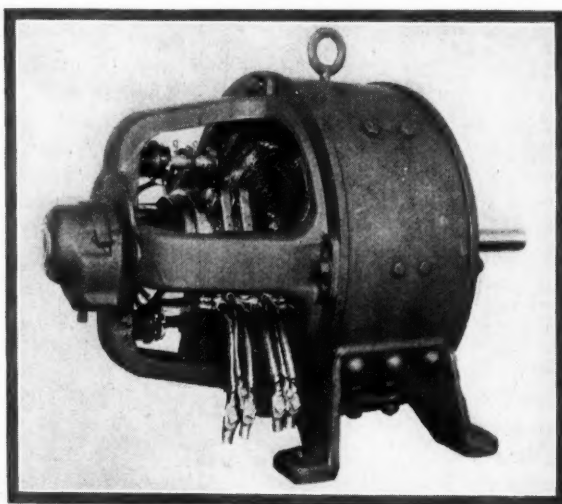


Fig. 1—Westinghouse type SK generator with special field winding (continuous rating, 26 kw., 175 volts at 1200 r.p.m.)

is linked to the steering knuckles at the end of the axle. The object of this small wheel is to produce the proper steering motion of the two wheels, so that the center planes of the wheels will always be tangent to the turning circle. These wheels are parallel only when the bus is running straight ahead.

Both of the trucks are provided with a fifth wheel that permits of swinging them through an angle of 45 deg. to either side of the straight ahead position. This fifth wheel arrangement not only makes it possible to turn the bus in a comparatively small circle but also is said to prevent sideward slip of the tires on the road.

The two front wheels of the rear truck are provided with an automatic device that permits knuckle steering. Cross links to these wheels are attached to a small wheel mounted slightly in front of and at the center of the axle. Control for this small wheel is provided by a telescoping rod attached to a point on the frame about 7 ft. in front of the axle. A pin connects this rod to the small steering wheel. In operation the rod turns with the frame, revolving about the center of the axle and turns the small wheel to which are attached the steering rods. This automatic con-

control functions in such a manner as to cause the wheels of the rear truck to follow almost the same tracks as those of the front truck.

It is not necessary to enlarge upon the difficulties met with when it is attempted to use the automobile type of transmission on heavy vehicles required to make constant stops and starts, as these are well known. It is, of course, mainly to overcome these difficulties that bus firms have taken up the gas-electric drive. Elimination of shocks or jars due to gear shifting, and consequent increase in the life of the engine and transmission parts, as well as the smooth acceleration with the electric transmission system are among the outstanding advantages of the system.

It may be well to enumerate here the advantages claimed for the use of the gas-electric drive on buses of all designs:

1. Elimination of the clutch and gearset.
2. Elimination of jar to the body and the improper use of the engine, thus increasing the life of both.
3. Smoother acceleration—decreasing breakage on freight vehicles and increasing the patronage of passenger buses.
4. Flexibility of control, permitting the maximum engine power to be used at very low vehicle speeds.
5. A practically infinite number of speeds.
6. More economical engine operation.
7. Application of power to two, four or eight wheels (on six or eight-wheelers) without mechanical complications.

Electric Transmission Desirable

The use of swivel type trucks and the weight and size of the vehicle made it desirable to provide electric transmission on the Versare eight-wheeler. An engine-driven generator, two motors, one on each bogie, and a controller were therefore provided.

A 60-hp. engine was first handled, but the initial tests indicated that this was too small, and it was replaced by a 100-hp. engine recently developed by the Waukesha Motor Company (the model 6-A, with 4½-in bore and 5¾-in. stroke). As the combined length of the engine

and generator exceeded the length of the available space, the generator was connected to the engine by a Ramsey silent chain. The complete unit was mounted at the rear of the driver's seat at the front of the bus, an arrangement which was obviously a makeshift.

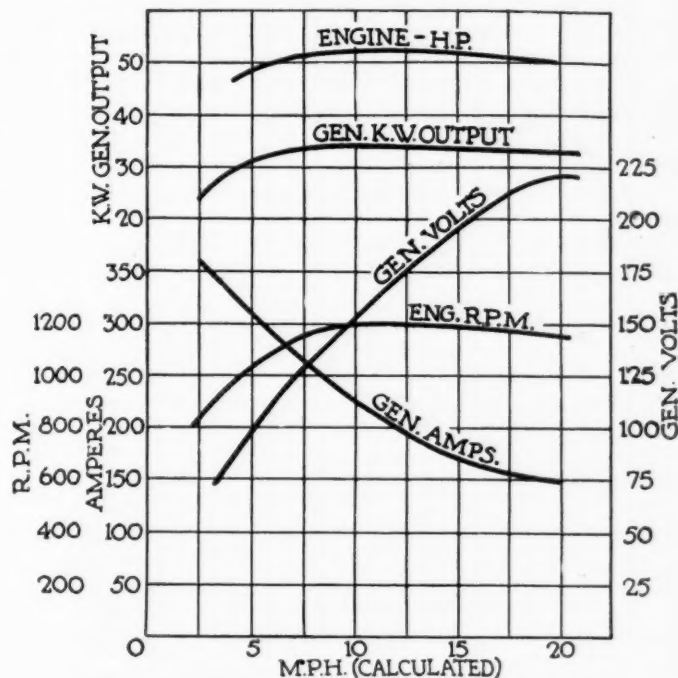


Fig. 4—Characteristic curves of operation for Versare experimental bus

The initial electrical equipment for the Versare bus was supplied by the Westinghouse Electric & Mfg. Co. The generator and motors are shown in accompanying illustrations. Being of the nature of an experiment, only standard equipment was used for the bus.

Sufficient room was provided on the trucks to permit of suspending the motors between axles. They were hung by straps from the truck frame and were provided with splined shafts for connection to a standard Eaton axle and differential. The overall reduction from the motor to the wheel was 9:45 to 1. This high reduction

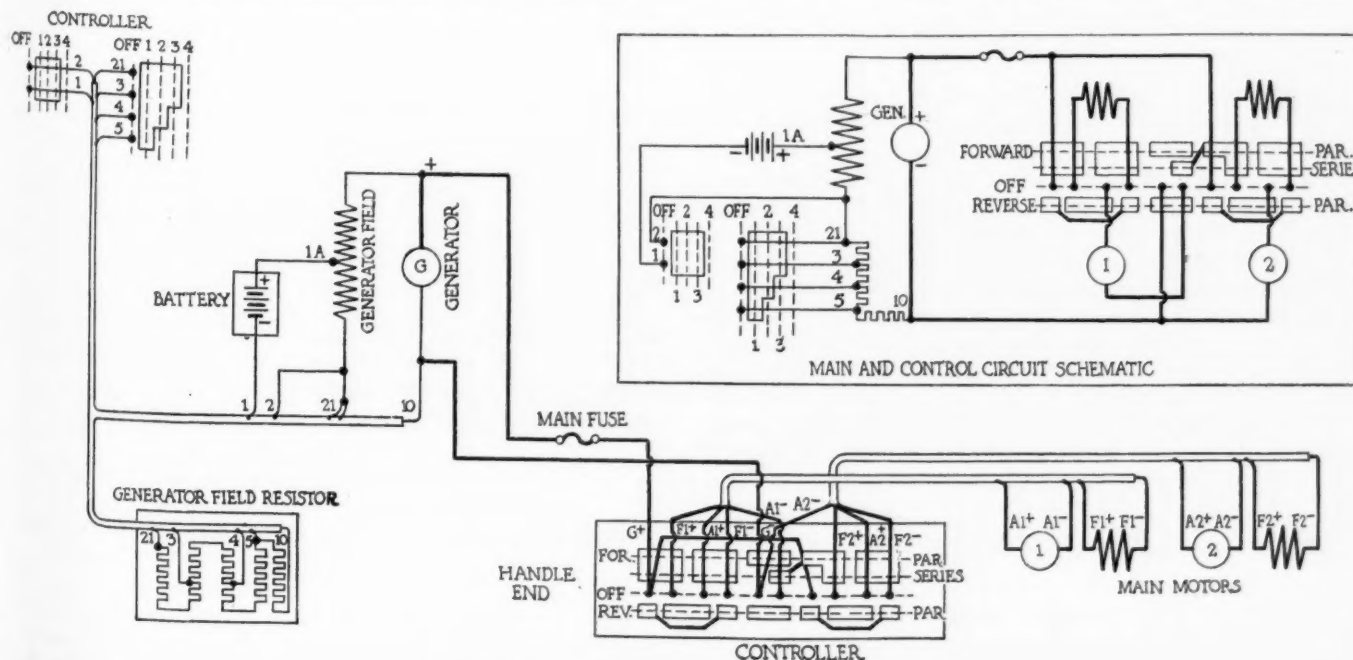


Fig. 3—Control diagram for gas-electric bus

ratio, combined with 33-in. wheels, permitted the use of high-speed motors, with consequent economy of space.

The generator was the standard SK type, provided with a special field winding to permit of a small amount of separate excitation. Vehicle type motors rated at 20 hp. were fitted and no attempt was made to alter the mechanical construction of this initial equipment. The master controller was of a standard type and permitted of three different connections of the motors—in series and in parallel for forward running, and in parallel only for reverse operation. This master controller was mounted directly under the driver's seat, and an operating lever extended up through the seat to the left of the driver.

Supplementary separate excitation was used to insure stable operation. This scheme is claimed to have the advantage over regulation for constant power by the use of a series field winding and a separate exciter, in that a very flexible reduction is provided between the engine

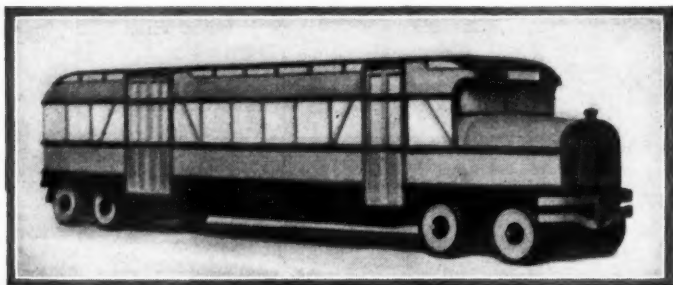


Fig. 5—Right-hand side of model of Versare eight-wheel coach which has been developed as a result of the operation of the trial equipment

and the wheels of the bus, making the speed of the engine practically independent of that of the bus, and, therefore, permitting the engine to be run at high speed when the bus is running at low speeds. This is a very desirable feature, as it gives maximum power when it is most needed. The field resistor control provided with this equipment was mounted to the left of the driver.

The type of control was very simple in operation and can be mastered easily by any bus driver in a few minutes. The engine is first started, of course, as in ordinary practice. The driver then throws the motor control lever into one of the operating positions. He is then ready to go.

The engine throttle is practically the only control regularly used, the variations in engine speed being sufficient to produce the desired voltages and hence bus operating speeds. The field resistor unit is used only when climbing very steep hills, as the drooping characteristic of the generator is great enough to prevent overloading the engine during normal operation. It also affords maximum acceleration under heavy loads, or on severe grades, or both. The master controller, connecting the motors to the generator, corresponds to the gear-shifting device on the ordinary automobile, but has to be moved less frequently, it is said. Grades up to 4 per cent can be ascended with the motors in parallel. The controller, therefore, is placed in the "parallel" position and left there until a grade of greater steepness is met or the bus has to be reversed.

The Battery Control

A clear understanding of the electrical circuit used may be gained from the schematic diagram of the control, shown in the illustration. The battery supplying current for the separate excitation of the generator field was controlled through the field controller. Segments

for resistance and battery control are both mounted on the same drum. Resistances are adjusted to such values as to permit ordinary operation of the bus with the resistance controller set in position 2. The separate excitation coil of the generator is so designed as to automatically take care of battery charging and to eliminate the need for attention by the operator.

Numerous tests have been made with this experimental equipment, in an effort to determine the required motor and generator capacity for such a bus, and the pick-up or acceleration with gas-electric control. The results of some of these tests are given in the set of curves reproduced herewith. On level roads the vehicle had a balancing speed of approximately 30 m.p.h. Acceleration was very satisfactory on all starts, whether made on the level or on steep hills. An idea of the good pick-up and accelerating rates may be gained from the fact that a schedule speed of 11 m.p.h. was averaged on mile runs with eight stops per mile of 10 seconds each. Tests were conducted on a road with a rolling profile, having grades up to approximately 4 per cent. Practically all starts were on up grades.

Calculations from meter readings and the motor characteristics curves gave a value of 40 to 60 lb. per ton for the sum of the friction, windage and road resistance.

100 Hp. Is Obtained

After some experimenting a maximum engine horsepower of 100 was obtained. The electrical equipment was so arranged as to be able to utilize fully the maximum power on heavy grade pulls, and good speeds were made on grades. Numerous tests were made on an 8.5 per cent grade. The usual speed on this grade was approximately 12.0 m.p.h., from 6 to 8 seconds being required for the bus to come up to this speed.

The tests with the initial equipment were so satisfactory that the Versare Corporation is proceeding with the design and production of a chassis on which a passenger body will be mounted. The new coach will seat 44 passengers and have a total weight of 16,000 lb. No radical departures will be made in the control equipment from that on the initial experimental bus, only minor changes, to make it handier and more nearly fool-proof in operation.

Resistance braking will be provided on the coach, to help out the air brakes. As on the experimental equipment, the motors will be connected in parallel for reversing and will be available for use as an emergency brake in case of failure of the air. Standard Westinghouse automotive air brakes were used on the experimental equipment and the same type will be used on the new coach, the only difference being possibly in the employment of a special valve that will prevent the driver from throwing on full air pressure at once and suddenly locking the wheels.

Mechanical changes will be made in the generator design to permit of its being coupled directly to the engine by means of a flexible coupling. This will make the forward end similar in appearance to conventional self-propelled road vehicles.

ANOTHER competition for motor trucks fitted with gas generators will be held in France next fall under the direction of the Scientific Committee on Gasoline. Road tests will be held in the north of France over a route about 1250 miles in length and these may be followed by bench tests. Wood, charcoal, coke and artificial fuels are permitted, but no raw coal. The contest will start on Sept. 15 and entries are received by the Automobile Club of France.

Interesting Study Gives New Aspects to Front Wheel "Wobble"

British research worker analyzes principles involved, shows in a tentative way how various features of design influence wobble and makes suggestions as to how trouble may be checked.

AN interesting paper on the subject of front wheel wobble—a subject which has caused a number of manufacturers a good deal of worry during the past year—was presented recently to the Institution of Automobile Engineers by A. Healey of the Research Department of the Dunlop Rubber Co., Ltd., Birmingham, England.

It appears that in addition to the terms "wobble" and "shimmy," which have been widely used in this country, English writers have used the expressions "gold-fishing," "wheel flap" and "tramping" to describe the phenomenon.

Although discussions of the trouble have extended over more than a year, no general remedy has yet been found, which in itself is sufficient proof of the complexity of the problem.

The author states that he has suggested to victims of wobble numerous possible alterations in the parts affected which seemed to him quite easy to carry out, but it was pointed out to him that even a trivial modification would call for considerable alteration elsewhere. For instance, a change in the width of the spring leaves would require alteration of the front end of the chassis; this in turn would require alterations in the engine, and so on, until the wave of alteration had passed through the car to the tail lamp.

On the other hand, when he confined himself to stating principles he was told that that would not cure wobble. After this little banter at the expense of automobile engineers the author begins with a statement of the principles involved. The paper is reproduced herewith practically in full.

An Ideally Simple System

We begin, says Mr. Healey, by considering an ideally simple system, consisting of a mass distributed in an arbitrary manner along a straight line (representing the axle) and supported at either end by springs (Fig. 1). The springs represent the suspension springs and the tires respectively. To make things still more simple, we assume that the chassis frame remains stationary. We now have to study the laws governing the motion of the axle.

It is obvious that the axle may vibrate in two ways:

- Fig. 1, parallel to itself, each end moving up and down together.
- About an axis through its center, so that when one end is up the other is down.

Each of these types of vibration has its own particular frequency, or period, and in general the periods are different.

With a given mass in the axle, we may have an infinite number of distributions, ranging from the case in which all the mass is at the center to that in which it is concentrated at the ends.

The two periods for some typical distributions are set out in Table 1 (number of cycles per minute):

TABLE I

		Period (a)	Period (b)
Case I.	All mass at center of axle..	427	Infinitely large
Case II.	Mass uniformly distributed	427	740
Case III.	Mass at ends.....	427	427

Before entering on a discussion of these figures, we proceed to deal with the effect of imparting periodic forces to the end of the axle. Suppose a harmonic force, that is, one which alternates between two maximum values, one upward and one downward, to be applied to one end. This is done in practice, for example, by an untrue wheel or by a wavy road.

If we start with a very long period, say one per minute, and gradually shorten the period to 1000 per minute, we find that the axle behaves in a curious manner. When our force has a period equal to that of the parallel motion of the axle, very large parallel vibrations are set up, but these die away as the period of the force shortens. Similarly with the angular vibration, or "criss-cross" vibration, when the force has the suitable period this type of vibration becomes excessive, but also dies away as the period is shortened. If there were no damping to the motion of the axle, the vibrations would be infinite, theoretically, and

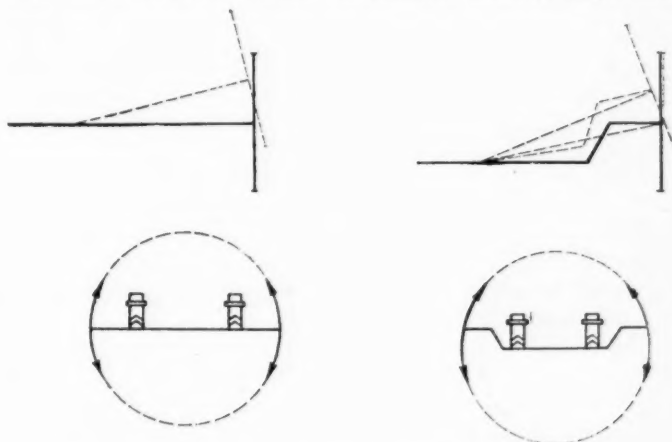


Fig. 1—Diagrams showing flexible support of axle and chassis and two possible forms of axle vibration

would be checked in practice only by collision with the chassis frame. Both springs and tires, however, exert a considerable damping action, and the vibrations in each case attain a maximum and then die away as the period becomes shorter and shorter.

By careful reasoning we are able to draw a curve showing the amplitude of the applied force. In Fig. 2, the broken line shows the variation in criss-cross vibration

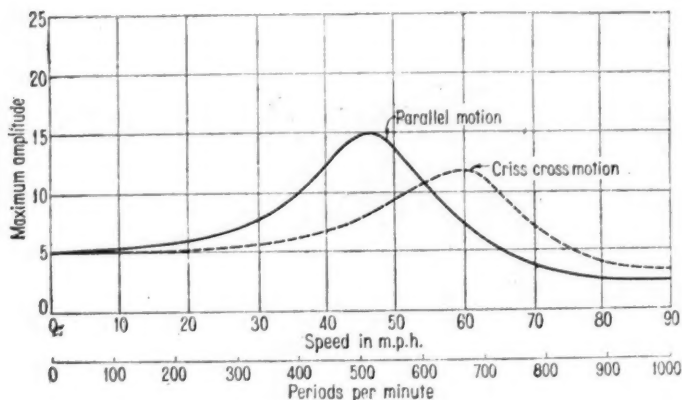


Fig. 2—Variation of amplitude of the two forms of wobble with car speed

for a particular car. For convenience, the horizontal scale shows, first, the number of periods per minute of the impressed force, and, second, the speed at which these periods would be obtained, supposing the force to be due to wheel irregularities. In the same figure the full line represents the corresponding variation in parallel vibration of the axle.

This car is fitted with high-pressure tires and no front wheel brakes. At a frequency of 690, the criss-cross vibrations reach their maximum, while at 520 the parallel motions are at a maximum. The speeds are 61 and 47 m.p.h. respectively. We now suppose the car to be fitted with low-pressure tires, but still without front wheel brakes. The result is shown in Fig. 3. The critical periods and speeds are now as follows:

For criss-cross vibrations... 580 53 m.p.h.

For parallel vibrations... 440 40 m.p.h.

Fig. 4 shows the effect of introducing front wheel brakes, and the situation is summarized in Table II, including amplitude as well as critical period.

We must defer the discussion of these results in relation to wobble until we have dealt with the gyroscopic action of the front wheels in a qualitative way.

Condition	Parallel Motion			Criss-Cross Motion		
	Critical Periods, No. Per Minute	Speed, M.p.h.	Amplitude, Arbitrary Units	Critical Periods, No. Per Minute	Speed, M.p.h.	Amplitude, Arbitrary Units
With high-pressure tires, no front-wheel brakes ...	520	47	15	690	61	11.5
With low-pressure tires, no front-wheel brakes ...	440	40	20.5	580	53	16
Low-pressure tires, with front-wheel brakes	420	37	22.5	510	46	18.5

When the wheels are spinning, and the axle is turning

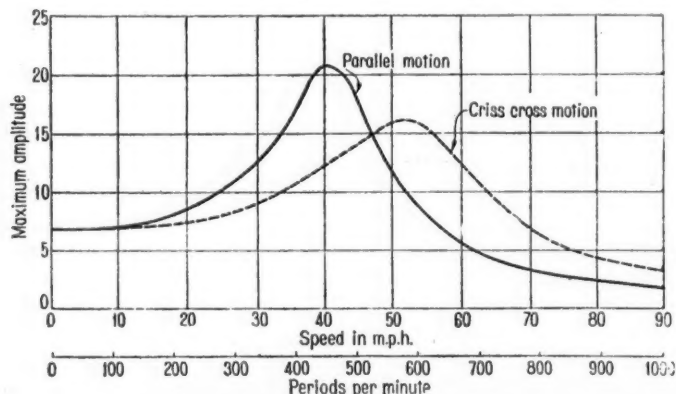


Fig. 3—Variation of amplitude with car speed when low pressure tires are fitted

about its center, the wheels not only move up and down with the axle, but, due to the gyroscopic action, turn in and out in the steering sense, provided that such movement is permitted by the gear.

From the driver's seat, when the left-hand end of the axle is falling, the wheel on that end will tend to turn outward, so as to steer the car to the left. At the same instant, the right-hand end of the axle is rising, and its wheel tends to turn in the same direction. Both wheels therefore tend to produce the same turning action on the steering gear, and it is almost unnecessary to add that when the axle moves in the other direction the reverse effect is produced. It follows that if the axle vibrates with criss-cross motion, there will be a tendency for oscillation of the wheels about a vertical axis. The greater the speed of revolution, the stronger the tendency. On a rear axle, no such oscillation is possible, but on a front axle, even when the kingpin is not vertical, and not in the plane of the wheel, there is a possibility of the oscillation occurring. It seems fairly evident that the resulting oscillation will be greatest when the kingpin is exactly vertical, and exactly in the plane of the wheel.

The importance of gyroscopic action lies in the explanation it affords of the setting up of a steering wobble. At a recent symposium on the subject, held under the auspices of the Society of Automotive Engineers, J. E. Hale went to a considerable amount of trouble to show how a normal up-and-down vibration of the axle would produce

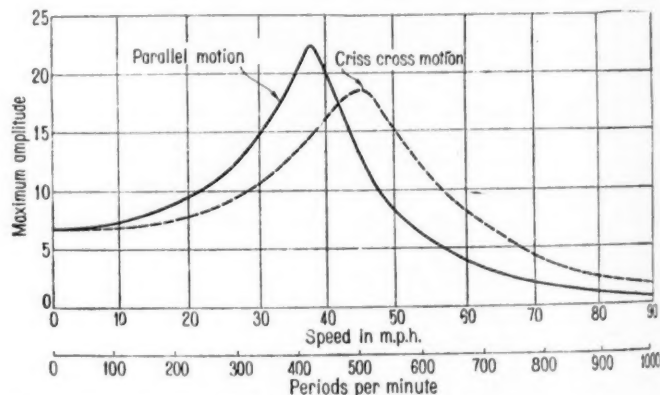


Fig. 4—Variation of amplitude with car speed when front wheel brakes are added

a turning of the front wheels. His explanation was that the axle moved exactly parallel to itself, up and down, while the end of the steering arm had to describe a circle. Consequently, the axle could not be moved upward without a slight turn of the wheels, and so a steering wobble results from a normal vibration of the axle. The present author admits that this factor may have a slight influence, but he does not find it necessary as an explanation of the phenomenon. If Mr. Hale's theory were correct, it would be possible to produce a type of wobble in which the axle moves parallel to itself, and such a type is unknown, and is theoretically impossible when we consider gyroscopic action.

We next turn our attention to a description of the phenomenon, which must form the principal basis of our discussion. The most remarkable fact about front wheel wobble is that while countless theories and remedies have been published, no full and accurate account of what constitutes wheel wobble has appeared. It is usual to differentiate between two forms of wobble, and these forms are called "low-speed wobble" and "high-speed wobble." That there are two distinct forms needs no proof to those who have experienced them, and there are other points of difference besides the speeds at which they occur.

Low-speed wobble occurs at speeds of 20 to 30 m.p.h. and consists of a pure and simple steering oscillation. The wheels do not rise and fall appreciably, and the front end of the car is set into violent lateral vibration. The steering wheel is also affected, and the result is most uncomfortable.

High-speed wobble occurs at speeds usually over 45 m.p.h. and consists of a steering wobble, combined with a violent criss-cross vibration of the front axle. When one wheel is up, the other is down, and the wheel which is down is pointing outward. The track of the front wheels



Fig. 5—Tracks of front wheels during high speed wobble

in a bad case of wobble is shown in Fig. 5, which is a reproduction from measurements made on a road.

Not only is the car set in violent lateral vibration, but also the front end is twisted, relative to the rear, and the whole car behaves in a manner which is both uncomfortable and alarming. It is sometimes stated that there is a critical speed, or speeds, at which the wobble develops. This is true, in the author's experience, in the case of cars which have a slight wobble, but not in the case of cars which have a very serious one. In the latter case the wobble is likely to occur at any speed above a certain point, such as 50 m.p.h.

Another fact is that some cars cannot be driven fast without violent wobble, while others show a wobble only occasionally. This applies to cars of the same make.

The author proposes to confine his attention to high-speed wobble, and to neglect the low-speed type for the following reasons:

1. Low-speed wobble is uncommon in new cars, and usually arises from slackness in the steering gear.
2. This type has been prevalent for many years, and means of eliminating it are well known.
3. It is not usually dangerous.
4. High-speed wobble affects new cars, in which every mechanical part is in perfect order.

Why Wobble Persists

We have to explain how it is that the wobble, once started, persists until the car is slowed down.

In most cars the steering wheel is arranged so that the front wheels are turned back into the straight by the reaction between the tire and the road, if the steering wheel is not held. Looking at the axle from the driver's position, the left-hand wheel is turned as it descends, and on striking the ground is wrenched suddenly back into the straight position. The wheels overshoot the mark, and begin to turn in the opposite direction. The process is assisted by the gyroscopic action to a degree determined by the speed of the revolution and the moment of inertia of the wheels. If the speed be low, the wobble consists merely of turning in and out of the wheels without up and down vibration of the axle. The criss-cross vibration of the axle, accompanied by the synchronous in and out turning of the wheels, is a natural mode of vibration, and it is

sustained by the forces which are applied to each wheel as it comes into contact with the ground.

In analyzing the subject we shall try to find what kind of front axle design is susceptible to a wobble and what kind is likely to increase and to maintain a wobble which has been started. The precise road irregularities or speed, or wheel bias, or tire bias, which start the wobble are relatively insignificant, for with an axle design which is unsusceptible to a wobble, or unable to maintain a wobble, it cannot be produced by these accidental circumstances. The causes then are in the design of the axle, rather than in the accidental conditions, for all these should be allowed for in the design. We have seen that the wobble is inseparably bound up with the criss-cross vibration of the axle, and we are in a position to study the various factors which tend to produce vibrations of this type.

From Table 1 it is seen that the period of criss-cross vibration is infinitely short if all the mass is concentrated near the center of the axle. With any reasonable amount of damping in the springs, such vibrations would be immediately damped out, even if they were ever excited. It is clear that with such an axle, it is almost impossible to start, and quite impossible to maintain, a criss-cross vibration. The conventional type of rear axle, having a considerable mass near its center, is as near as we ever get to these conditions, and it is a well known fact that the rear axle invariably vibrates parallel to itself, and never in the criss-cross fashion, at all ordinary speeds. The gyroscopic action of the wheels also tends in the same direction, for such action offers no resistance to the movement of the wheels in their own planes, but only to any turning out of the planes.

The conventional front axle, however, especially when fitted with brakes on the wheels, is more nearly represented by Case 3, where the mass is equally divided between the two ends. In this case, the period of vibration

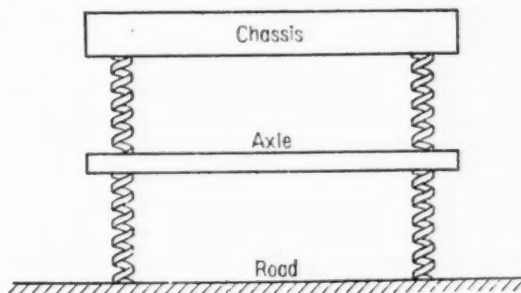
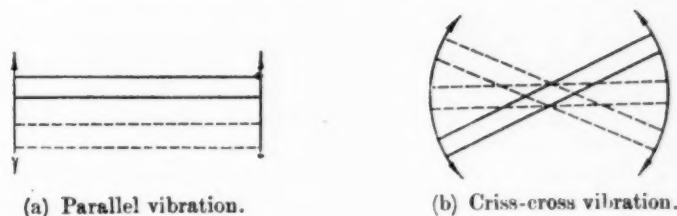


Fig. 6—Showing effect of drop axle on direction of vibration of wheels

is the same for both criss-cross and parallel movements, and one is just as likely to be set up as the other. This is very undesirable, for the system is very susceptible to wobble.

Weights fixed to the ends of the axle add considerably to the moment of inertia of the system about its central point, while not unduly adding to the total mass. Therefore, the period of criss-cross vibration is much more reduced than that of parallel motion. For example, an

addition of 44 lbs. to each end of the axle would alter the period as follows:

	Criss Cross Period	Parallel Period
Before adding weights.....	740	427
After adding weights.....	550	380

The alteration to the parallel period is of no significance, but the reduction from 740 to 550 in the criss-cross period means that this type of vibration is more likely to be induced in the range of driving speed, if there is any lack of balance or regularity in the wheels, or if a more or less regular sequence of road waves is encountered.

The effect of using softer tires is to lengthen the criss-cross period, and if low-pressure tires are used, the damping factor of the whole system is reduced, and there is therefore more opportunity for the wobble to develop, as explained in the preceding paragraph.

Springs and Tires Not in Plane

In the ideally simple case we regarded the springs and tires as being in the same vertical plane. This is not usual in motor cars, the springs being attached to the axle at points nearer to its center. The effect of this is to lengthen the period of the criss-cross vibration, while that of parallel vibration remains the same. When we remember that the former period depends both on the strength of the springs and the moment of their thrusts about the center, and that the latter period is determined by their strength only, the situation will be readily understood. It may be further illustrated by imagining the springs to be attached very near to the center of the axle. Obviously, the simple up-and-down vibrations are unaffected, while the criss-cross vibrations are much slower.

At this stage it should be borne in mind that the calculated periods do not hold good when the tire is bouncing off the road—the higher the bounce, the longer the period. When bouncing occurs, the points of attachment of the springs have a much more important influence on the period, since the springs alone exert any twisting action.

For these reasons, it is better to keep the springs as far apart as possible.

Some axles are practically straight from wheel to wheel, and at the same distance from the ground as the hubs, while others are dropped more or less in the center, to keep the chassis low down. This point has a slight effect on the movements which produce a wheel wobble, because the center of oscillation of the axle is lower, and when criss-cross vibration is set up, the wheels, viewed from the front of the car, turn more out of the vertical (see Fig. 6). There is naturally a considerable resistance to this motion, by reason of the contact between the car and the road, and the dropped axle should improve matters. However, wobble has occurred even with a front axle with a very large drop, and this characteristic is not therefore a cure.

The gyroscopic effect is proportional to the moment of inertia of the front wheel about its own axis, and it is therefore desirable to concentrate the masses of the wheel as near as possible to the axis. There is not very much room for improvement as far as the tires and rims are concerned, and these are responsible for a large part of the moment. The author is not in a position to say anything of the possibilities of re-designing front-wheel brakes with this point in view.

The distance between the king-pin and the plane of the wheel has an important influence on gyroscopic action. The shorter the distance, the lower the speed at which the wheels may maintain a "conical precession." It is calculated that for a 6-in. distance, the speed to give this phenomenon is 50 m.p.h., and if the king-pin is in the plane of the wheel, the speed is 25 m.p.h.

There is an additional effect of this distance, namely, the longer the distance, the more inclined is the king-pin to the plane of the wheel, and the less favorable the conditions for pure gyroscopic action.

The inclination of the king-pin, viewed from the side of the car, is usually termed the castor angle, and it results in the wheel tending to keep in the same direction as the car. While an alteration of this angle will often correct a low-speed wobble, it appears to have no effect on the high-speed wobble. The author has knowledge of many experiments which have been made on a car suffering from the complaint in a serious form. All kinds of angles were tried, but without any improvement being obtained.

It is clear that shock-absorbers will tend to diminish the criss-cross vibration of the axle, and should therefore tend to reduce the wobble. In an actual car, a high-speed wobble was almost completely eliminated when the shock-absorbers were made stiffer in their action.

It would be unsafe for the chassis designer to depend on such a makeshift, for shock-absorbers are not absolutely perfect, and cannot be depended upon to check the wobble indefinitely, but the car owner who is in trouble may usefully apply the method. The nearer the shock-absorbers are to the wheels, the more effective will they be.

Gear Important Factor

An irreversible gear, in proper order, will not permit more than a slight wobble, but the public, according to most designers, demand a reversible one, which has the advantage of automatically straightening itself out after taking a corner. Although the irreversible steering gear will prevent a serious wobble, it does so at the expense of enormous stresses in its parts, especially in the worm, screw, or other mechanism which provides the irreversibility. Sooner or later, there will be sufficient wear to allow a considerable wobble, and as time goes on, the rate of wear will increase. There may be ways and means of overcoming this defect, such as by fitting a device which automatically takes up any slackness or back-lash, but this does not seem an engineering method of curing wobble. There are, however, various degrees of reversibility, and it certainly is inviting trouble if the degree is too high.

General experience, both in the United States and in Europe, indicates that lack of balance of wheels (and tires) is not the real cause of the trouble. Perfect balancing of wheels has not eliminated the trouble, although there is a little evidence to show that it reduces the chance, but not the severity, of a wobble.

Lack of Wheel Balance

Lack of balance of the wheels will cause a large criss-cross vibration of the axle, when the number of revolutions per minute equals the number of natural vibrations of the axle per minute. The wobble will then appear, but, unless the gyroscopic action is of its most suitable magnitude, will not be maintained, and probably will not reach any serious proportions. At a high speed, the criss-cross vibration may be set up by some irregularity of the road, and if the conditions are suitable, the wobble will be maintained by conical precession. It may therefore happen that there are two critical speeds, giving wobble of different severity.

The wider the track, the less the angular motion of the axle for any given amplitude of vibration of the wheels, and the less the gyroscopic effect.

J. E. Hale has described an experiment in which the front springs were virtually replaced by wooden blocks. This completely eliminated the wobble. He deduced that it would be a good thing to employ stiffer springs, but this is not justified. The wooden blocks cause the whole car and the axle to vibrate as one, and the period of vibration

would be about 80 to 100 per minute, while the stiffening of the front springs would make the period of the axle vibration shorter, say, 600 instead of 500 per minute. There are actually two modes of vibration of the axle, one of about 100 per minute and one of about 500. The wooden blocks eliminate the latter, which is closely connected with wobble. This experiment does prove, however, the present author's argument that the criss-cross vibrations of the axle are a necessary concomitant of the wobble. A stiffer spring will increase the number of periods per minute of the axle, and if the wobble be due to wheels out of balance, will put off the wobble to a higher speed. On the other hand the stiffer spring may bring the period in "resonance" with the rate of conical precession and produce a wobble in a car which formerly had none. A speaker at the before-mentioned symposium stated that this had happened in one of his cars.

GENERAL DISCUSSION

It will be seen that there are several ways of producing a wobble—

1. The axle may be set in violent criss-cross vibration by a suitable combination of road-wave length and car speed.
2. The wheels being out of balance or untrue, will tend, at a certain definite speed, to set the axle in criss-cross vibration producing a more or less mild form of wobble.
3. If the condition for conical precession without torque occurs simultaneously with the above, the wobble will be more serious.
4. When a very violent disturbance has been produced, the natural period of vibration is much lengthened. For any given car, therefore, there is a possibility of producing a wobble by a violent shock, although the speed may not be great enough to generate one on its own account, by virtue of lack of balance.

The problem is seen to be extremely complex, which fact precludes the possibility of giving a universal solution, but does not preclude the possibility of intelligent experiment.

Two Classes, Basic and Palliative

We may divide the experimental modifications into two classes, basic and palliative. The basic modification aims at eliminating the susceptibility of the axle to give a wobble, and the palliative at minimizing the effects or the amount of the wobble. In the following list the modifications are in very approximate order of importance.

Basic Modifications

- Any means for restoring the high periodicity of the front axle, when vibrating in the criss-cross fashion.
- Increase of distance between king-pin and plane of wheel.
- Reducing weight at end of axle.
- Reducing moment of inertia of front wheels.
- Stiffening springs.
- Increase of distance between springs.
- Dropping center of axle.

Various means of accomplishing Item 1 suggest themselves to the author, but he refrains from trespassing into the domain of the engineer.

Palliatives

- Device to damp out lateral vibrations of wheels.
- Shock-absorbers.
- Alterations to steering box.
- Any means for damping criss-cross vibration without impeding parallel vibration.

A further experiment made by Mr. Hale was the replacement of the steering links by a hydraulic system. This entirely eliminated the high-speed wobble, and Mr. Hale deduces that the wobble was caused by the interaction of the links described previously. This is not necessarily so, for the hydraulic gear would exert a very great damping influence on the wobble, and reduce its intensity to an inappreciable amount. On the other hand, it is quite possible that in the particular car used by him, the wobble was started by the steering mechanism, though the author cannot see how it could go on increasing the wobble after the wheels were wobbling sufficiently to accommodate the circular motion of the end of the tie-rod.

Two and Three Critical Speeds

It is undoubtedly a fact that some cars have mild wobbles at two or even three critical speeds. We have already accounted for two speeds, and bearing in mind that the period of criss-cross vibration is not constant, but dependent on the extent to which the wheels leave the ground, it is not difficult to understand how further critical speeds may arise. We may indicate three sets of conditions:—

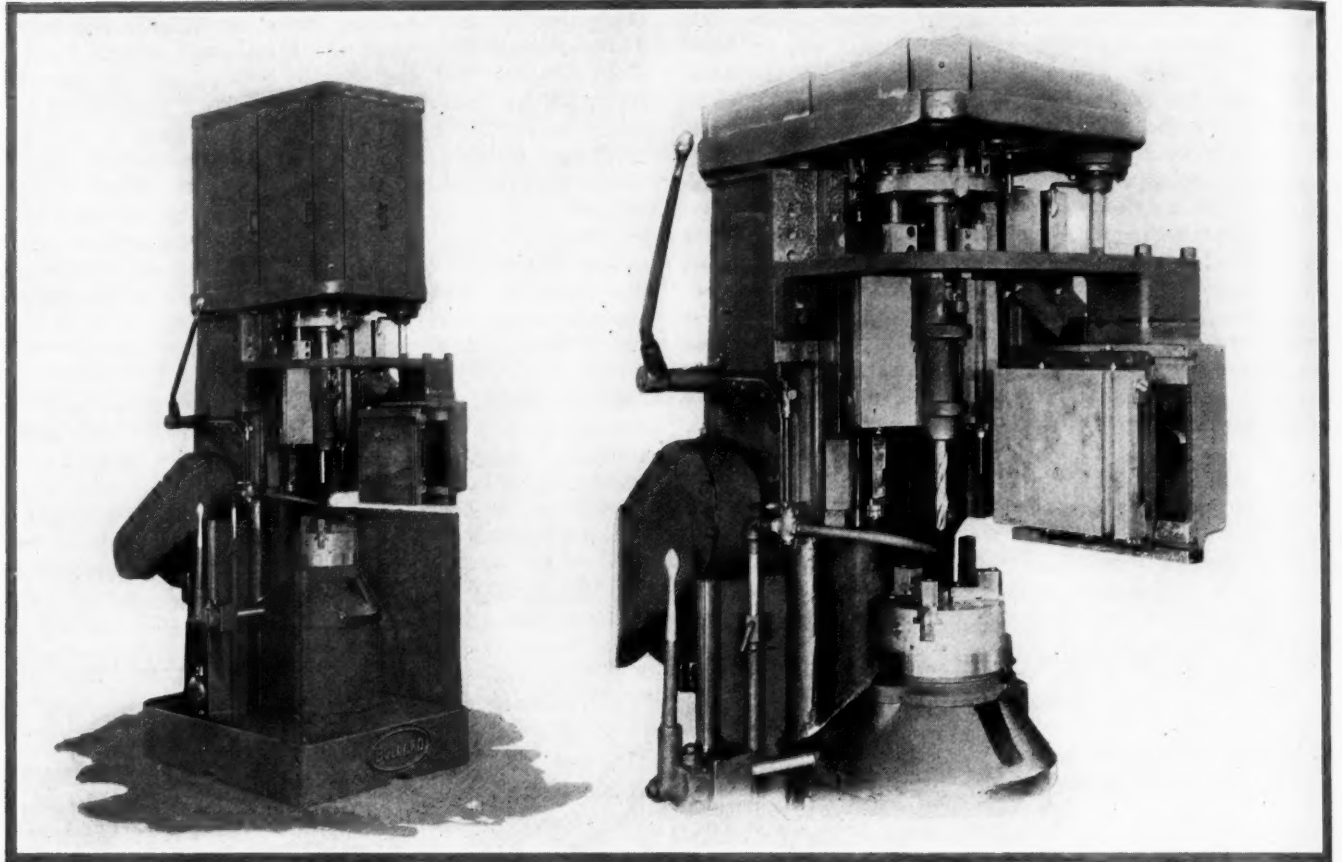
1. Wheel out of balance, having a number of revolutions equal to the period of vibration of the axle, while the tires are in contact with the ground.
2. The same when the tire is bouncing.
3. The axle vibrating at the period necessary to give conical precession without torque.

It has been said that the period of vibration of the wobble may be as short as one-fiftieth of a second, but the experimental evidence is unsatisfactory. The C string of a 'cello has a period of 64 vibrations per second, and therefore we should expect such a wheel wobble to emit a definite musical note. In the absence of any assurance to the contrary, this extremely short period must be regarded as due to the vibration of parts of the instrument itself.

Aluminum as Used for Castings

IN a recent lecture before the Birmingham Section of the Institute of British Foundrymen C. Dickens stated that pure aluminum was not much used for castings because its elongation was too high and its tensile strength too low. It was usually necessary to alloy it with other metals, and Specification L5, laid down by the Air Board, provided for a content of 2.3 per cent copper and 12.14 per cent zinc. The product was an alloy used considerably in the automobile trade for crankcases and gear-boxes. Sand cast, this alloy had a tensile strength of 10 tons and an elongation of 6 per cent. When chill cast, the figures were 14 tons and 4 per cent respectively. Alloy L11, containing 7.8 per cent of copper and 1.2 per cent of zinc, withstood fairly high temperature, and was useful for cylinders. L8, containing 88 per cent of aluminum and 12 per cent of copper, was shown as "piston alloy." Chill cast, it had a tensile strength of 10 tons and an elongation of 1 per cent. An alloy of aluminum with 5.13 per cent of silicon possessed advantages from the point of view of casting, feeding, and avoidance of porosity. Another alloy which had been used with success in permanent moulds contained 92 per cent of aluminum and 8 per cent of copper. It had a tensile strength of 11 tons and an elongation of about 3 per cent.

THE Morris Cowley Company of England has purchased the Leon Bollee automobile factory at Le Mans, France, and plans to start the manufacture of automobiles there. This move is a result of the high duty exacted on automobiles imported into France.



General and detail views of the new 8-in. Bullard Vert-Au-Matic, the detail view showing the supplementary side head in the foreground

New Bullard Machine a Simplification of the Mult-Au-Matic

Vert-Au-Matic is single-spindle, vertical chucking machine for production work. Supplementary side head adds to variety of operations which can be performed

A SINGLE-SPINDLE vertical automatic chucking machine is announced by The Bullard Machine Tool Co. of Bridgeport, Conn., as the latest addition to its line of automatic production machine tools. It is to be known as The Vert-Au-Matic.

This machine is markedly similar to the four-spindle and six-spindle Mult-Au-Matics, with which the trade is already familiar, and is, in fact, a standard machine built of standard parts used in the multiple spindle models. It is one unit of the Mult-Au-Matic without its coordinating control and indexing features which are, of course, unnecessary in a single spindle machine.

The Vert-Au-Matic is at present being built in the 8-in. size only.

In the 8-in. model pieces up to 6-in. in height and swinging 12-in. in diameter can be handled. Development work on this model has already been completed and it will be followed within a very short time by two larger sizes, the capacities of which also run parallel to the Mult-Au-Matic the 12-in. size taking work 6-in. high and swinging 16 in. in diameter, and the 16-in. size, taking

work 6 in. high and swinging 21 in. in diameter.

The construction of the Vert-Au-Matic is typically Bullard throughout. The work spindle is of standard design, with a self-centering, conical thrust bearing under the spindle-head and two cylindrical bearings of large diameter and proportionate length to absorb side strain. The spindle drive is through a shaft and spur gears from the standard Bullard Mult-Au-Matic feed works located in the head of the machine, from which point spindle speeds are determined by change gears which make possible twenty-three changes ranging from 33 to 300 r.p.m.

The feed works, as in the Mult-Au-Matic, also provides in the same manner for twenty-three possible feed changes ranging for the main head from 0.0067 to 0.06 in per revolution of the spindle.

The main tool head is designed for vertical motion only and is similar in construction to the plain head of the Mult-Au-Matic, except in length of stroke. The full tool head travel is 9 in., and by limiting the capacity of the machine to work 6 in. high, this allows 3 in. clearance for chucking. This head may also be equipped with a drill

spindle having a capacity up to 1¼ in. in diameter, No. 3 Morse taper shank.

One feature of the Vert-Au-Matic is the supplementary side head, which is the same as is used on the four-spindle Multi-Au-Matic. This device consists of a heavy bracket firmly secured to a scraped bearing on the column and adjustable in height sufficiently to provide for its application to any required operations on work within the capacity of the machine. On this bracket is mounted a swivel and tool slide capable of 4-in. vertical, horizontal or angular tool feed, while within it is the actuating mechanism which provides rates of feed in direct proportion to the main head feed. The feed ratio is determined by change gears in the bracket easily accessible from the rear of the head. This arrangement brings into effective operation two independent tool heads, in combination with a drill head when required.

Power Chucking Device

A second feature consists of a power chucking device—a recent Bullard unit which has been successfully applied to Multi-Au-Matic and Contin-U-Matic work spindles for mechanically actuating chuck jaws or holding fixtures. This is claimed to be an effective time and effort saver, for by simply throwing the chuck lever in one direction or the other, the jaws are opened or closed by power, the time required for this operation being only two seconds. The device provides a positive grip mechanically maintained and is a part of the machine itself, not dependent upon outside sources for actuating or holding. Adjustment for jaw tension is provided within the device so that work may be held as required and distortion from over-clamping avoided.

The cycle of machine operation starts with placing a rough piece in the chuck and throwing the chuck lever. Then, by tripping the clutch lever, power is applied to the spindle, and the tool heads advance rapidly to the point of cutting, are fed through the cut, then quickly returned, and the clutch is disengaged by automatic control. One operator may therefore attend as many machines as the time of the cycle will permit. No effort on his part is required beyond placing and removing the work and manipulating the chuck and clutch levers; nor has he any control of the machining functions after the job is set up.

Lubrication is by a constant flood of oil, which is circulated from a reservoir in the base by a pump driven directly from the constant speed main shaft. The oil is forced to the top of the machine, passing through a filter which removes all foreign matter. From this point it is fed by gravity to all of the inclosed operating units.

Convenience in operation results from placing Vert-Au-Matics in a battery, side by side, for the operating space required between spindles is less than 4 ft. The projected floor space is 45 in. wide by 50 in. front to rear, and the machine stands 102 in. high.

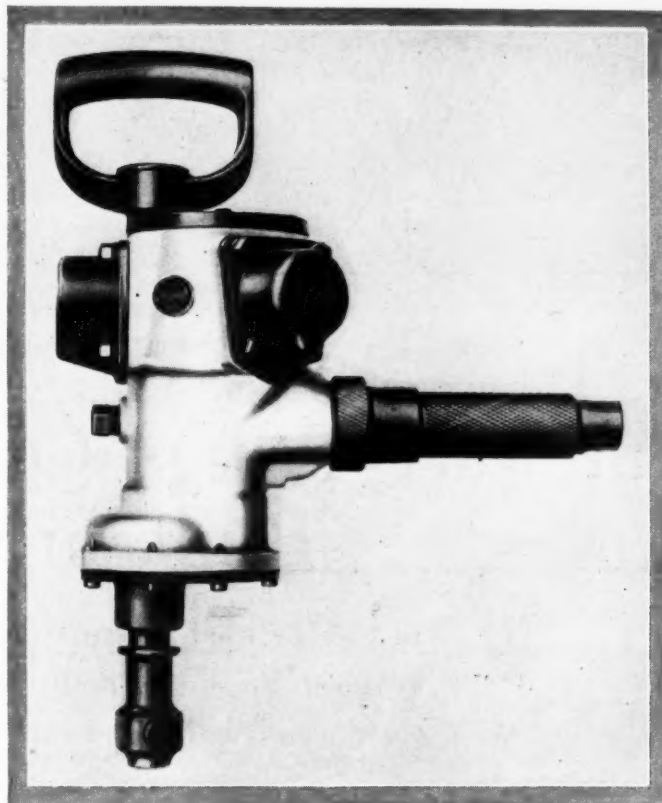
5 Hp. Generally Used

The power required is, of course, proportional to the work, but in most cases the 8-in. Vert-Au-Matic operates satisfactorily with 5 hp. The machine may be driven from a counter shaft or a constant speed motor by belt. Standard construction, however, provides for individual motor drive with chain connection to the main shaft which should run at 760 r.p.m.; therefore a 5 hp. motor, either a.c. or d.c., with a constant speed of approximately 1200 r.p.m. is satisfactory.

A pad for motor mounting is provided on the back of the column, adaptable to the types of motors available. The Vert-Au-Matic is intended for the production of chucked work requiring one chucking or a series of single or group operations.

New Wood Drilling Machine

A NEW size light-weight, reversible, pneumatic wood drilling machine has been brought out by the Ingersoll-Rand Co. This new drill is known as the size DD and is suitable for wood drilling up to 1 in. diameter. The construction is similar to that of other three cylinder drills which the company manufactures. The average working speed is 705 r.p.m., the weight (inclusive of the grip handle and chuck) is 15 lb. and the size of hose recommended is ½ in. The drills are furnished with a spade handle and bit chuck as standard. A breast plate or feed screw can be substituted for the grip handle and a drill chuck for the bit chuck.



Ingersoll-Rand DD pneumatic wood drill

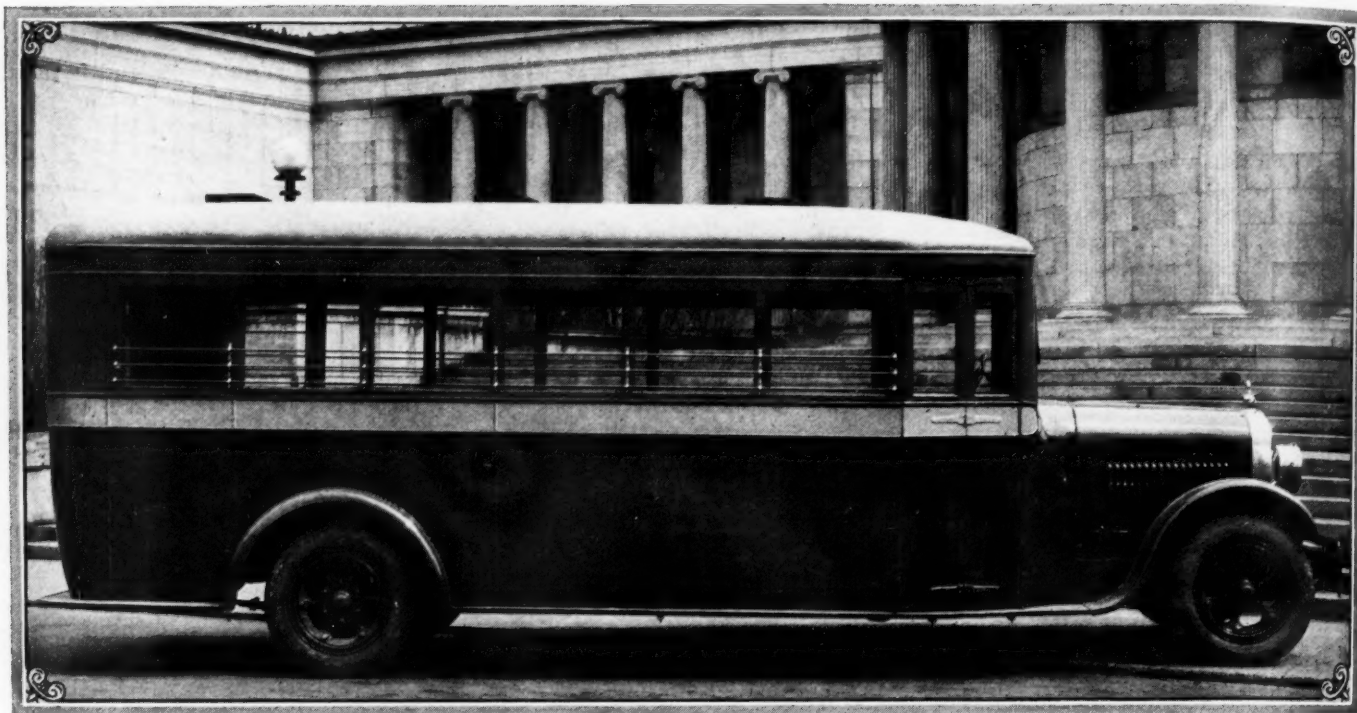
Standardization of Milling Cutters

THIRTY-FIVE per cent of the sizes and varieties of milling cutters listed in present trade catalogs will be eliminated through action taken at a conference of makers, users, Government officials and engineering society representatives held recently at the Department of Commerce under the auspices of the Division of Simplified Practice.

A standing joint committee was appointed to study technical and other problems, and to effect a liaison with a standardization section which the American Engineering Standards Committee is to create for study of this item.

Production on all but the standardized varieties will be stopped on July 1, while the conference fixed Jan. 1, 1926, as the date for the elimination of other varieties.

Francis S. Walters of the Westinghouse Electric Co. of East Pittsburgh, Pa., and E. K. Wennerlund of the General Motors Corporation, Detroit, Mich., discussing the program from the viewpoint of users, were in favor of further technical studies. These two men were named as representatives of users on the joint committee of the industry to continue work in this direction.



The new 25-passenger Stewart bus which is being built in two chassis sizes

Stewart Brings Out New Bus Chassis Built in Two Sizes

Will also be used for truck service. Six-cylinder engine gives speed range of 4 to 40 m.p.h. Low floor, stiff frame construction and emergency brake are features.

By Donald Blanchard

FLEXIBILITY, low floor height, stiff frame construction and a novel design of propeller shaft emergency brake are among the features of a new six-cylinder, 25-passenger capacity bus chassis which has been brought out by the Stewart Motor Corp., Buffalo, N. Y. The new chassis is built in 198 and 220-in. wheelbase lengths priced at \$3,950 and \$4,150 respectively. It also will be sold as a 2½ to 3-ton capacity truck chassis.

A high-gear speed range of from 4 to over 40 m.p.h. is claimed for the new bus chassis, and, inasmuch as pneumatic tires are standard equipment, full advantage may be taken of its speed capabilities under favorable road and traffic conditions.

The frame side rails are pressed from ¼-in. steel and have a maximum depth of 9 in., with 2¾-in. flanges. The frame length back of the dash is 231⅞ and 253⅞ in. on the short and long wheelbase models respectively. There are seven well-gusseted cross members which are made of 3/16-in. stock. Six brackets are riveted to the outside of the side rails to support the body. The top of the frame is 23 in. above the ground except where it is kicked up over the rear axle. The road clearance is 8 in. and the tread is 72¼ in. at the rear axle.

Accessibility for maintenance is a feature of the propeller shaft emergency brake. This brake is assembled

as a separate unit, which is supported by angle-iron brackets riveted to two adjacent cross members at about the middle of the frame. Malleable iron castings are used for the supporting members, the hub and the drums. Bridged across the angle iron brackets are two castings to which the brackets supporting the brake are bolted. These brackets carry an intermediate shaft, which is supported at each end in a taper roller bearing, and to which the hub supporting the two brake drums is keyed. The roller bearing at the forward end of the shaft is arranged to take backward thrust, and the one at the rear, forward thrust. The brake bands, which act externally on the drums, may be removed separately or the entire assembly may be taken out as a unit without disturbing any other part of the chassis. To facilitate service at this point, a trap door should be provided in the bus floor directly over the brake. The brake drums are each 4 in. wide and 8½ in. in diameter.

The engine is a Continental with 3¾-in. bore and 5-in. stroke, with a maximum output of 70 hp. It is equipped with Stromberg carburetor, air cleaner and 6-volt Remy starter, generator and ignition unit. Twelve-volt Leece-Neville electrical equipment, with voltage regulator, may be had at an additional cost of \$100. Both the clutch and transmission are of Fuller make, and are assembled

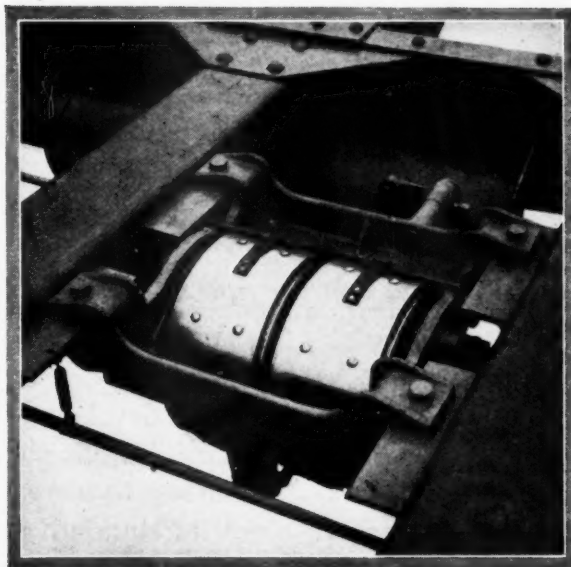
with the engine in a unit powerplant. The former is a multiple dry disk design with 14 plates, and the latter provides four speeds forward and reverse.

The powerplant is supported at three points, the front support being in the form of a trunnion. The hold-down bolts at the front support are fitted with coil springs to give some flexibility at this point. At the rear, the engine is supported by flexible pressed steel brackets riveted to the frame side rails. Coil springs also are provided on the mounting bolts at one of the rear supports. The radiator has a one-piece, polished aluminum shell, which is supported on 1-in. rubber pads mounted in brackets riveted to the frame side rails. The hold-down bolts at each side also are fitted with coil springs to provide additional flexibility.

Power is transmitted from the rear of the transmission through a slip joint to a 2¼-in. tubular propeller shaft with a metal universal joint at its rear end. This joint connects to the forward end of the emergency brake shaft. From the rear end of the latter shaft, a second 2¼-in. tubular propeller shaft with metal universal joints at each end, leads to the rear axle.

A Clark semi-floating, helical bevel gear axle is used, optional reduction ratios of 5.6 or 6.25 to 1 being offered. Rear axle torque and propulsion is taken through the springs. The service brakes, which are 17 in. in diameter and 4 in. wide, act internally on drums on the rear wheels. In order to make these brakes equally effective under all load conditions, the operating cables lead to idler levers mounted on the frame side rails. Short links connect these levers with those on the brakshafts. By introducing the idler levers, the effect of spring deflection has been effectively neutralized.

Semi-elliptic springs of silico-manganese steel are used front and rear, the former being 42 in. long and 3 in. wide and the latter 60 x 4 in. The springs are located directly below the side rails and those at the rear are underslung on the axle. The steering gear is a Ross cam and lever type and the spark and throttle controls, and the horn button are mounted on the top of the column.



Accessibility for maintenance is a feature of the propeller shaft emergency brake.

The front axle is a drop center type of I-beam section and is of Shuler make.

The gasoline tank has a capacity of 30 gal., and is regularly mounted at the rear of the frame, although side mounting is optional. Gasoline is fed to the carburetor by the vacuum system.

The rear wheels are of the dual type. The tires are 32 x 6. in. pneumatic and the wheel equipment consists of seven Budd disk wheels. Other equipment includes speedometer, oil gage, front bumper, electric horn, tool kit, jack, Alemite lubricating system, spare rim, stoplight, motometer, headlamps, ammeter, switches and clock.

The list prices cover the chassis finished in lead.

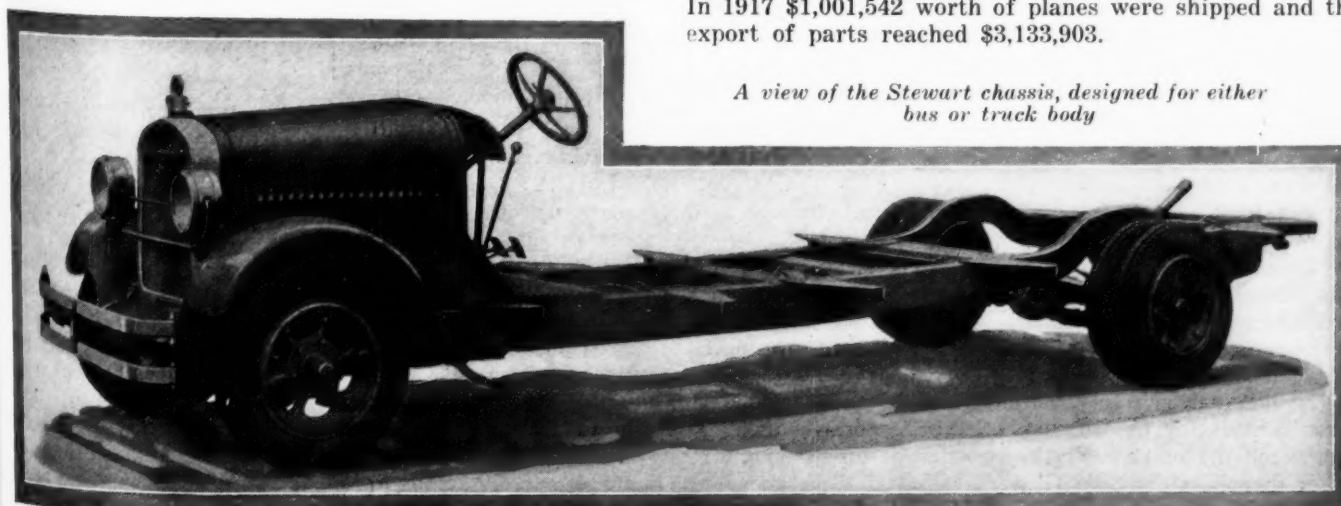
Airplanes and Parts Exported by U. S.

AMERICAN airplane exports last year were the heaviest since 1920, a total of 56 complete machines representing a total monetary value of \$411,458 being routed to foreign markets. In addition to this, airplane parts valued at \$165,021 were exported. In 1920 foreign countries took 65 American planes, having a total valuation of \$598,274, and \$554,375 worth of parts.

The 1924 figures show a substantial increase over 1923, when a total of 46 complete planes valued at \$308,151 were exported, with parts totaling only \$58,949.

The bulk of the exports last year were consigned to Mexico, South America and Cuba, the former leading with 16 planes valued at \$150,300. Argentina was next with 16 machines worth \$59,876. Shipments to other countries were as follows: Chile, four planes, \$12,670; Brazil, four planes, \$37,995; Cuba, three planes, \$28,000; Nicaragua, one plane, \$1,500; Honduras, one plane, \$5,162; Canada, one plane, \$600; United Kingdom, five planes, \$34,250; Norway, one plane, \$28,000.

The years 1916 and 1917 still stand as the greatest in the export history of the American airplane industry, due to heavy purchases of planes by England and Canada for war purposes. In 1916 the exports of complete planes were valued at \$2,158,395, in addition to parts worth \$4,843,610. In 1917 \$1,001,542 worth of planes were shipped and the export of parts reached \$3,133,903.



A view of the Stewart chassis, designed for either bus or truck body

Dual Cutters Are Adjustable on Standard Milling Machine

New fixture adapts standard machines to uses which ordinarily require highly specialized types. Special cutters handy feature.

This is an example of how a standard machine fitted with special cutter heads can take care of a broad range of operations which heretofore required a larger, more costly machine.

The development is interesting because it is in line with the well-developed tendency to increase the field of usefulness of standard machines by the application of special heads and fixtures.

THE picture in this article illustrates a two-head arrangement developed by Kearney & Trecker for application to the various Milwaukee milling machines. As shown, the housing which carries the inner spindle is mounted on the slide at front of the column and is clamped to this member and the two cylindrical overarms. The combination of two overarms is peculiar to this make of milling machine, and in this case it permits central mounting of the two spindles with consequent equal capacity for table travel in both directions. The outer housing or head is carried on the overarms and therefore is adjustable with regard to the distance between the two spindles.

Intermediate gears drive the inner vertical spindle from the regular horizontal spindle. Another pair of gears and a splined quill construction transmit rotation to the gearset of the outer head, the splines being used to allow for shifting the outer spindle. As it is sometimes desirable to have the spindles rotate in opposite directions, as in interlocking facing work on a single wide surface, a selective reverse gear is placed in the outer head and is operated by the lever shown in the foreground of the illustration. In combination with the selective reverse control for the regular horizontal spindle, this arrangement makes possible the rotation of either cutter in either direction.

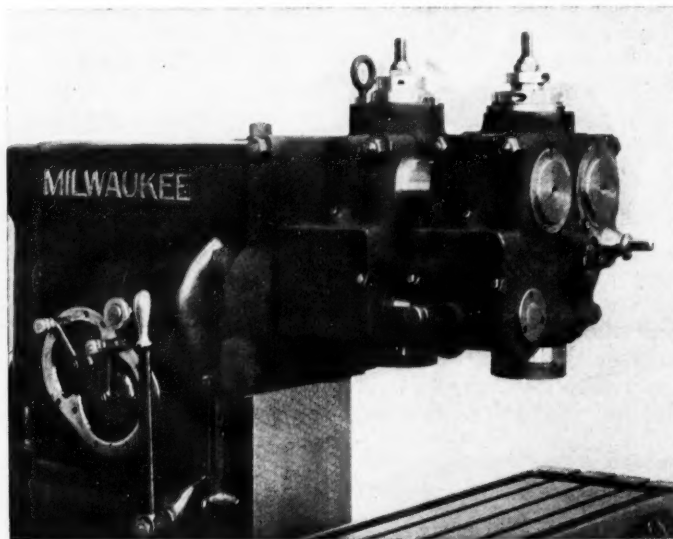
In addition to the possibility of changing the location

of the outer head on the overarms by means of the square extension shown at the extreme left, the outer spindle also can be adjusted vertically so that cuts can be taken in different planes or in the same plane without requiring cutters of the same dimensions from the back shoulder to the cutting edge. The cross adjustment for the outer spindle consists of a screw, and a micrometer dial is placed

at the square extension. The vertical adjustment is located at the top of the outer spindle.

When using large facing cutters which are mounted on a spindle that is at an exact right angle to the direction of the table travel, trouble is experienced sometimes from dragging of the back edges of the cutter. This dragging action over surfaces which have been cleaned up by the leading side of the cutter tends to spoil the finish. In order to eliminate this difficulty, eccentric bushings are mounted in both heads, each bearing on the same overarm. These bushings are adjustable as shown on the outer head and

both can be rotated to the extent required to tilt the spindles slightly from the right angle position. The clamp bolts which secure the inner head to the vertical slide are freed during such setting. The adjustments and reverse features described in conjunction with the variety of possible positions of the standard table and the variable speed gearset, which is standard equipment, make this a very flexible arrangement.



Two-head attachment for standard horizontal machine. Reverse lever for outer spindle shows in foreground. Eccentric bushing and lateral head adjustments at left

EDITORIAL

War Taxes

"SHOULD Congress repeal the war taxes on automotive products," reads a statement from the National Automobile Chamber of Commerce, "an average price reduction of \$31 per car and running much higher on the medium and higher priced models would take effect immediately." The statement was made following a visit of leaders of the industry to Secretary of the Treasury Mellon to urge upon the Secretary the need for abolition of war time taxes still levied against the automotive industry.

This very definite statement is typical of the frankness and sincerity with which the automotive industry has been handling its relations with the public. It would be an easy matter to talk about public benefit in general terms while striving to get the taxes removed and then quietly forget about passing the whole benefit on to the car user afterwards. Similar things have been known to happen.

But the automotive industry has put itself on record in specific terms regarding its intentions if the taxes are removed, thus providing another example of the constructive leadership which long has characterized the handling of automotive affairs.

When the war taxes were removed from certain classes of trucks a year ago, truck users got the benefit of the reduction. Throughout its career the automotive industry has pursued the policy of giving the public a good product at the lowest possible price, seeking profits through wide distribution rather than exorbitant prices.

Pan-American Standardization

A MOVEMENT has been started, probably as a result of the efforts of our Government to promote uniform practice in industry, to get the countries of the Western Hemisphere to agree on the same industrial standards, and a convention for the discussion of problems connected therewith was held at Lima, Peru, some months ago. The idea of Pan-American standards is a very attractive one, but there would appear to be one great stumbling block in the way of its realization—the use of different standards of measurement north and south of the Rio Grande. If it were not for the use of different systems of units we probably would arrive at universal industrial standards before long.

The subject of a uniform system of weights and measures—the C. G. S. system—was broached at the Congress, but this is a matter regarding which little is likely to be done beyond a statement of its desirability. However, uniformity of weights and measures is not at all essential to cooperation in standardization work. This is proved by the fact that the

ball bearing standards, which are on a metric basis as regards outside dimensions and on an inch basis as regards ball diameters, are the same throughout the world. The same applies to magneto standards. A magneto with a shaft height of 45 mm. above the base and base holes at the corners of a 50 mm. square can be mounted on almost any engine with provisions for magneto mounting, wherever manufactured. Thus there should be no difficulty for the South Americans in cooperating with us, even though their system of weights and measures is different from ours.

Cut-Off of Headlight Beams

DESIGNERS of headlights and headlight lenses in recent years have been endeavoring to secure a sharp cut-off of the projected beam on top, as this results in better road illumination without annoyance of other road users by glare.

In order to make it possible to drive safely at night at practical speeds, the roadway must be illuminated a considerable distance ahead of the car. It would do little good if the driver could see obstructions only when they were close ahead of him, because it would then be too late to stop the car and prevent a collision. The distance ahead at which obstacles of large size are clearly visible determines the speed at which a car can be driven safely at night, for this distance must be at least equal to the minimum in which the car can be stopped by the brakes.

At present we eliminate or reduce glare mainly by giving the beam a downward inclination. The top of the reflected beam must not be so high that it strikes the eyes of oncoming drivers or pedestrians, and if the beam has considerable vertical depth, its center, which is generally of the greatest intensity, will meet the road surface a rather short distance ahead of the car. On the other hand, if the beam has a rather sharp cut-off, it does not require so much downward inclination, the light can be thrown on the road at a greater distance from the car and the driving conditions be materially improved from the standpoint of safety.

Elwood Haynes, Pioneer

ONLY those who have themselves lived through them can really know the trials of the pioneer. Only those who know the trials can accurately appraise the triumph reflected in the pioneer's achievement of his aim. Elwood Haynes was a pioneer and to him came success measured in accomplishment and the satisfaction which only the achieving pioneer can know. It came through far-seeing vision backed by persistent, intelligent effort and the ability to battle with discouragement. What Elwood Haynes did lives after him to benefit all mankind.

Our Industry Today

March Placed Eighth in Automobile Output Annals— Closed Car Preference Causes Shortages— Foreign Shipments Show Gain

NEW YORK, April 15—With a production record of 362,000 cars and trucks March was eighth in the list of the automobile industry for all time, and indications are that this excellent showing will be bettered by at least 50,000 vehicles during April. Virtual capacity has been reached by the factories, and best of all, this productive activity is a response to genuine demand.

Instances of shortages have already developed; these being mainly in closed cars. The factories are having the utmost difficulty in meeting the demand for all-season vehicles, and the body companies are, of course, benefiting greatly from this condition. If the two large producers of low price automobiles are left out, the industry is running about 65 per cent to closed cars, an extraordinary gain since this time last year, when the percentage was below 50. The two companies excepted are turning out between 40 and 50 per cent closed models.

The great advantage to the industry of the preeminent place in public esteem of the closed car is that sales, and therefore production, are being spread out more evenly over the year. The time of the enormous increase in summer and rapid falling off as cold weather approaches is past, and this means economy in production and overhead costs.

Another favorable sign of the current period is that foreign trade is showing substantial gains. The companies that have made the greatest efforts to win foreign markets in the past all have expansion programs under way, and several newcomers are about to make their entry into the field. By all the signs and portents 1925 should be a record-breaking year in sales overseas.

Body Builders Will Convene in Detroit

NEW YORK, April 15—Plans and topics for talks and discussions have been announced for the fifth annual convention of the American Body Builders Association, which will be held in Detroit June 1 to 4.

It is the intention of officers of the association to devote considerable time at the convention to a consideration of Federal taxes and reduced taxes on bodies. Another important subject will be preparation of plans leading to a plea for revision of freight rates. Among other topics considered are: "Trends in Body Models," "Bus Nomenclature," "The Requirements for a Practical Bus Finish" and "A Practical Enduring High Luster Lacquer Luster."

The success of the 1924 exhibition and meetings and the activity expected at the coming convention have necessitated more room than formerly, so the ballroom and connecting assembly hall of the Statler Hotel have been secured for the displays and assemblies.

did so because it is their belief that the motor vehicle should be made as cheap an instrument of transportation as it is possible to sell and still maintain the quality which has made the American car a standard product.

The secretary was told that the motor industry at the present time is carrying about 95 per cent of all the special excise taxes levied on manufacturers during the war and more than 60 per cent of all special excise levies passed at that time which still remain. It was pointed out that since the termination of the war the tax on persons and commodities carried by rail, most of the telephone tax, motion picture and other excise taxes have been repealed. No industry—other than the motor industry—it was shown, has carried the excise tax levies that have been put on the automobile and the time is now propitious for Congressional suspension of this burden, leaders of the industry declared.

Aside from the general ground of inequity, the automobile executives based their presentation to Secretary Mellon on two grounds:

(1) That the motor vehicle is a major element in transportation and should be freed from undue levies.

(2) That the farmers favor repeal of the motor tax. The motor group called the secretary's attention to the fact that rural communities own one-third of the vehicles and the farmers' representatives were among the many who asked for a reduction of these levies at the last session.

Representatives of the industry at the conference, which was held in the office of Secretary Mellon, were: H. H. Rice, president Cadillac Motor Car Co.; R. E. Olds, chairman of the board, Reo Motor Car Co.; Windsor T. White, chairman of the board, White Motor Co.; David S. Ludlum, president of the Autocar Co.; A. T. Waterfall, vice president Dodge Brothers; M. L. Pulcher, president Federal Motor Truck Co.; T. R. Dahl, vice president of the White Motor Co.; George H. Pride, the Autocar Co.; Alfred Reeves, general manager National Automobile Chamber of Commerce, and Pyke Johnson, Washington representative of the N. A. C. C.

Peerless Sales Gain

CLEVELAND, April 13—Sales of Peerless automobiles last month showed a decided increase in all sections of the country, according to figures just released by Charles A. Tucker, sales manager of the Peerless Motor Car Co.

These figures showed that last month's sales, totaling 496 cars throughout the country, exceeded those of January and February of this year combined and were 61 per cent greater than those of March, 1924. Last month's business was the best since July, 1923, with the exception of one month. Sales for the first three months of this year, aggregating 972 units, were 28 per cent higher than those of the first three months of 1924.

Makers Urge Repeal of War Motor Taxes

Treasury Department Inclined to Discount Effect of Re- sulting Cuts

WASHINGTON, April 14—Leaders of the motor industry called on Secretary of the Treasury Mellon this week to urge that he recommend to Congress the repeal of the war excise motor taxes. Through officials and members of the National Automobile Chamber of Commerce the secretary was told that a 5 per cent price reduction would automatically go into effect in the wholesale price on all new passenger cars immediately when Congress repeals the present discriminatory war excise motor levies.

After the conference, Treasury officials said that while Secretary Mellon favors lowering of all forms of luxury taxes, he opposes repeal of any one in preference to the others. Treasury officials, in an interview with the representative of AUTOMOTIVE INDUSTRIES, expressed the belief that the Treasury department does not feel that the auto tax has any effect on sales and were inclined to discount the optimism of automobile officials that the 5 per cent reduction in price, promised, would result in an appreciable amount of new sales.

The average price reduction will amount to \$31 per car and will run much higher on the medium and higher priced models, leaders of the industry officially told the secretary. It was pointed out that all passenger cars are sold on a basis of nationally advertised prices plus the war tax, and the motor executives said that in asking for a reduction they

Ford Tries New Purchase Plan

**\$12.40 Secures Delivery of Touring Car in Detroit
Under Experimental Terms—May Be
Adopted Nationally**

DETROIT, April 15—Sales of Ford cars under a down payment ranging from \$12.40 to \$111.40, according to model, is being tried out experimentally in the Detroit district only by Ford Motor Co. The plan will be made national if found successful here. That the plan has gotten away to a tremendous start is indicated by the fact that the company reports 4000 applications made in the first three days of its operation.

The plan provides for the immediate delivery of a car to a buyer who is able to make the small down payment required, and who can give definite assurance of his ability to make the weekly payments. The buyer also must have two endorsers, who likewise can give definite assurance of their capacity to make the payments, should the buyer fail to perform his purchase obligations. Down payments are graduated according to the type of car desired and its equipment. Down payments run from \$12.40 to \$111.40, depending on the model and equipment, and weekly payments run from \$5 to \$13.

Buyers Investigated

The closed models are all made with starter. There is option, however, of balloon tire equipment, the difference in price for which is covered in the larger down payment required for the two sedans, and for the higher weekly rate on the coupe. In making the experiment of car delivery on a low down payment basis, the company emphasizes that it is not opening the gate to irresponsible buyers. Under the conditions of the sale, the ability of the buyer and each of his endorsers to make payments on schedule is investigated. Each must have regular employment at a rate of wage which makes certain that the payments will be met without interference with the regular mode of living of the buyer or his endorsers. The purpose of the plan is to enable persons of good standing, who have not accumulated down payments under the regular monthly payment plan to have the benefit of a car immediately. Payments are so arranged according to model that the full purchase price is completed within a year at a rate of interest only slightly higher than at the regular one-third down monthly payment plan. All of the paper during the period of experiment will be handled by the Detroit Discount Corp., under a special arrangement worked out between the Ford company

FORD OPINION ASKED ON MUSCLE SHOALS

WASHINGTON, April 15—Henry Ford has been invited by the President's Muscle Shoals Commission to submit his views on the disposition of the property, it has been announced at the White House. The letter, asking Mr. Ford to give the commission the benefit of his advice, based on the careful study which has been made by the Ford engineers, was sent this week. Chairman McKenzie declares that the invitation to Ford does not mean that the commission is yet ready to consider bids. It is felt that notwithstanding Ford's declaration that he no longer wants the property that he will submit a bid.

and its Detroit dealer organization, the finance company passing on all applications and assuming responsibility for the completion of the deal.

Presentation of the plan is being made by dealers through a city-wide canvass. The terms of down and weekly payment as outlined represent minimum acceptable payments according to model, but higher payments may be made where convenient to the buyer. The addition of this plan gives dealer salesmen four buying plans to present in canvassing the non-owner field: all cash, one-third down and monthly payments, the new plan and the savings plan. Applications for cars under the plan now under experiment reached 4000 in the first three days, over 1500 being received on the second day. The number of sales that will be made from these depends entirely upon the ability of the appliers to meet the required conditions of payment and guarantee.

Dealer Meeting Called

A meeting of all dealers in the Detroit district will be held at Detroit branch headquarters Friday, at which the company will receive a detailed report from each dealer on the buying reaction. This meeting will indicate the early result of the experiment and possibly may cause the factory to set a date for making plans applicable to the entire country. The experiment will be continued, however, until its possibilities are fully disclosed.

The Ford Motor Co. of Canada, Ltd., has likewise instituted the plan in the border cities experimentally, under conditions similar to those in Detroit, ex-

cept that prices are somewhat higher owing to the higher list price of the Canadian car. In Canada the experimental period will end this week, as the quantity of cars set aside for the experiment will all be sold during this time.

Belnap Resigns as Rolls-Royce Head

SPRINGFIELD, MASS., April 15—L. J. Belnap of Montreal, Can., has resigned as president of Rolls-Royce of America, Inc. His successor has not yet been named. Harry C. Beaver of Longmeadow, Mass., who has been treasurer of the company since it was organized, has been elected vice-president in charge of operations. Mr. Beaver said tonight that the change marked no departure in the policies of the concern.

Mr. Belnap has large business interests in Canada, where he is identified with the Rudel Belnap Co., manufacturer of machine tools, and several other concerns. He has divided his time between Montreal and this city, but has found it increasingly difficult to do justice, it is said, to interests so widely separated.

The statement of the company is as follows:

L. J. Belnap has resigned as president of Rolls Royce of America but will remain on the board of directors. His connection with Rolls Royce dates back to the last two years of the war when as assistant director of the British war mission in the United States with headquarters in Washington he came from Montreal and on behalf of the British Government directed the production of Rolls Royce airplane engines in the United States. Late in 1919 the English company decided to form an American company for the production of Rolls Royce motor cars in the United States, although Mr. Belnap had many other active business interests, he was prevailed upon to become president of the American company and has since directed its active management. Mr. Belnap has made no definite plans for the future other than to take a well deserved rest and give some time to his personal business interests. Mr. H. C. Beaver, treasurer of the company since its organization has been elected vice-president in charge of operations.

BATTERY SALES GOOD

PHILADELPHIA, April 15—Officers of the Electric Storage Battery Co., at the annual stockholders meeting, were authorized to set aside each year, beginning in 1925, a sufficient number of shares of unissued common stock for subscription by employees, following the custom for the past two years.

It was officially stated that the sales of the company are comparing favorably with the corresponding period of last year, and that the outlook for the second quarter is equally as good. The motor industry is reflecting good business in batteries.

Hewitt Rubber Sold to Company Heads

Control Secured by J. H. Kelly
and F. V. Springer—No
Price Stated

BUFFALO, April 14—Announcement was made Tuesday of acquisition of the control in the Hewitt Rubber Co. of this city by J. H. Kelly and F. V. Springer, officials who have been actively engaged in the management of the concern for several years. The price paid to the Hewitt estate is not reported, but the company is capitalized at \$1,000,000 preferred and \$1,000,000 common stock.

Mr. Kelly will be the new president of the company. He entered the rubber manufacturing business with B. F. Goodrich Company in 1898. He later went with the Republic Rubber Co. and in 1912 became vice-president and a director of that concern. He joined the Hewitt Company as its vice-president in 1917 and has been in active charge since. He is a member of the executive committee of the tire and mechanical divisions of the Rubber Association of America.

Mr. Springer was a railroad man in early life and in 1905 became manager of eastern railroad sales for the Republic Rubber Co. and later its general manager of railroad and export sales. He joined the Hewitt Company at the same time as Mr. Kelly.

Plan Production of Pyroxylin Plastic

WILMINGTON, DEL., April 13—Plans have been completed for the formation of the Du Pont-Viscoloid Co., to manufacture and deal in pyroxylin plastic products and articles. The company, it is expected, will be chartered at Dover this week.

A material manufactured from pyroxylin plastic was recently installed in the windows of the taxicabs owned by a large operating company. The advantage of the new material is that, if accidents occur and passengers are thrown against the windows no injuries are received from broken glass. The material is flexible, which also helps to lessen the impact of the passenger against it. The windows are green in color which makes them glare-proof, thus preventing glare from headlights in the rear affecting the driver's vision and also protecting the passengers from sunlight. They are said to be non-shatterable and bullet-proof.

The new company will take over and carry on the business heretofore conducted by the Viscoloid Co., Inc., with plant at Leominster, Mass., and also the pyralin business that has been conducted by the Du Pont company in Arlington, N. J.; Poughkeepsie, N. Y., and Norwich, Conn.

John F. Palmer is consulting engineer with the company. He is the originator and patentee of the cord tire and has long been an advocate of balloon tires. During the last year the Hewitt Company has been developing a new type of tire for passenger buses, a tire aimed to increase the comfort of passengers and to decrease the wear on city pavements.

ENGLISH SERVE TEA AT GAS STATIONS

WASHINGTON, April 15—A novel idea for adoption in gasoline service stations has been reported to the automotive division of the U. S. Department of Commerce by the American Consul in England. Gasoline supply branch stations throughout England are adding quick lunch tea rooms for the benefit of motorists. The idea is said to be rapidly spreading and new filling stations near London are almost "petrol palaces." Many have free wash-up and brush-up rooms as well as lunch facilities, where members of the motor party may satisfy their thirst for tea, cake and sandwiches while the car is being filled with gasoline.

INSURANCE RATE WAR

TORONTO, ONT., April 13—Competition among insurance companies for automobile business has developed a rate war that has resulted in cutting of rates about 20 per cent. The cut has been made in theft, fire, property damage and public liability. These classes of insurance cover the major portion of all risks. Competition has become so keen that several companies are seeking the business of houses with fleets of vehicles at a reduced rate, and allowing the employees of the firms to come in under the arrangements. Complaint has been made to the Ontario insurance department against this discrimination.

DENMARK HAS 500 BUSES

WASHINGTON, April 16—There are at present 500 buses in operation in Denmark, with a combined road service considerably in excess of twice the length of all Danish railroads, it has just been revealed at a conference between the representatives of Danish bus routes and those of private and State roads.

Acting Commercial Attaché Harry Sorensen at Copenhagen advises the Automotive Divisions of the United States Department of Commerce that it is hoped as a result of the conference to have the bus routes serve as feed lines to the railroads, which will put Danish transportation on a more sound basis.

Akron Makers Report Tire Sales Gaining

Buying Stimulated by Open
Weather—20 Per Cent Better Than 1924

AKRON, April 15—Open weather in most parts of the country during recent weeks has stimulated sales of automobile tires, according to sales managers of tire companies here. Volume of business in the industry is reported to be about 20 per cent greater than prevailed at this season last year.

Business in the spring of 1924 was poor for some rubber companies, and for some time production ran ahead of shipments. The motoring season was late, due to cold weather and almost unprecedented rains.

Another favorable factor for the industry is the fact that tires are due to be replaced this year on new automobiles sold in 1923. Approximately 4,500,000 automobiles were marketed in that year, which means that about 18,000,000 tires will be needed alone by these car owners.

A partial survey just made by one rubber company shows that considerably more motor vehicles are in operation now than in the same period last year. Another indication that the motoring season is well under way is the fact that gasoline consumption has recently mounted to high levels.

Early forecasts are that the survey being conducted by the United States Department of Commerce, in conjunction with the Rubber Association of America, will show normal stocks of tires in the hands of dealers. There does not appear to be any danger at this time of a large surplus of tires being created, as result of excessive production, according to W. O. Rutherford, president of the rubber association and vice-president of the B. F. Goodrich Co.

Adjustment Made in Mitchell Co. Suit

WASHINGTON, April 15—Settlement of a claim for \$600,000 by the Federal Government against the bankrupt firm of Mitchell Motors Co. of Racine, Wis., has been adjusted it has been announced by the Government, upon payment of \$85,000 for all claims.

The claim of the Government was based on a war contract refund. During the war the motors company was under contract to make motor trucks for the Government on a cost-plus basis. The company received \$400,000 as a bonus on the completion of the trucks. Later the Government started suit on the grounds that the cost plus contract and the bonus were contrary to public policy. On April 18, 1923, the company passed into the hands of receivers.

Ford Japanese Plant Starts Operations

Yokohama Unit Confined to Local Markets—Conditions Favorable

DETROIT, April 14—Assembly and distribution of Ford cars and trucks in the Japanese market is now under direction of the Ford Motor Co. of Japan, Ltd., recently established in Yokohama, the new plant commencing operations about April 1, at which time the change over of dealer relationship to direct control also took place.

Shipments to dealers are now going forward from the new plant, railroads being used for all consignments except those going to the Yokohama-Tokyo district, which are handled by drive-aways. Under present operation, the new organization is devoting its efforts entirely to the development of the Japanese market, which includes Korea and Formosa.

Conditions in Japan are regarded by the company as favorable for steady and continued assimilation of automotive products. There is a fairly good system of roads, which, though narrow and congested with traffic near the large centers, are well adapted for automobile travel, and there is also considerable road improvement and new road construction taking place, which is stimulating a well-developed interest in automotive transportation and ownership.

The more general use of automobiles will, no doubt, bring improved and wider highways, as it has done in other countries. By directing the assembly and distribution of its products, the Ford company feels that the development of the use of motor vehicles in the empire will be stimulated in many ways.

Its dealer organization, handling Ford products exclusively, extends to all the larger cities and towns of Japan. These

dealerships are all in the hands of Japanese, who have been instructed in Ford sales and service methods, and there are a number of dealers who have made considerable progress in equipping their service departments with the most modern tools and appliances.

Ford truck sales in Japan have been particularly gratifying. Because of the roads and bridges, truck use is limited to the lighter types, and the Ford truck is especially well adapted for Japanese road conditions and requirements. Great interest is reported by the company on the part of farmers in the use of Ford trucks for conveying their products to market points. Small farmers, unable to finance the purchase of trucks individually, are banding together to purchase trucks and use them jointly.

Part of Wescott Co. Sold for \$81,000

SPRINGFIELD, OHIO, April 13—The plant, real estate and certain water rights of the Westcott Motor Car Co. have been sold for \$81,000 to a local syndicate by order of the United States District Court. The buyers were J. B. Cartmell, Arthur H. Hill and George Cugley, all of the Buckeye Incubator Co.

The property included in the sale is the largest Westcott plant, 14 acres of ground and half of the water rights in Buck Creek. Permission has been granted by the court to retain the plant until Sept. 1 for the manufacture of Westcott cars, and it is stated by Receiver J. H. Rehe that there is a possibility of the balance of the property being acquired by men in another city who have manifested a desire to reorganize the company and manufacture cars in Springfield or some other city.

The machinery, equipment and product of the Westcott Motor Car Co. was not offered for sale and it is said that manufacturing may continue in some sections of the property after Sept. 1.

The Westcott company was brought in 1916 to Springfield from Richmond, Va., where it was originally descended from the Westcott Carriage Manufacturing Co.

Require Rubber Tires on Belgian Tractors

WASHINGTON, April 16—A recent decree in Belgium requires all automobile tractors and trailers to be equipped with solid rubber or pneumatic tires, Commercial Attaché Fayette W. Allport at Brussels advises the Automotive Division of the Department of Commerce. He adds that "those now in the field say that the cost of converting existing equipment will be prohibitive, with the result that present owners will lay up their present equipment and abandon the use of tractors in industrial hauling."

The decree, which was originally scheduled to come into effect on Feb. 1, has been extended to June 1, and a further extension will be granted.

Plan Big Output of Dagmar Cabs

M. P. Moeller, Who Took Over Penn-American Corp., Re- ports Good Demand

PHILADELPHIA, April 14—The M. P. Moeller Motor Car Co., Hagerstown, Md., which has been organized to manufacture Dagmar cars following the taking over by M. P. Moeller of the Penn-American Motors Corp., of which he was preferred creditor, has an ambitious production program for this year. It is planned to produce from 3000 to 5000 Dagmars, including 1000 6-70 and 2000 6-60 models, as well as a large number of Moeller taxicabs, bringing the output close to 8000 motor vehicles.

The company, which is already under production, has received an initial order from the Astor Cab Co., Columbus Circle, New York City, for 600 taxicabs similar to the Luxor, and it is expected that subsequent orders will bring the total to 1500. The company also is anticipating the purchase of 2000 taxicabs as an outcome of a large merger of taxicab concerns in New York. Moeller is associated with seventy-nine active concerns, including a pipe organ factory which has been in the family for three generations.

The Dagmar Motors Co., the Philadelphia factory branch at 851 North Broad Street, which has been financed to the extent of \$100,000, has been reorganized with John Reichard as president. Ray T. MacFarland, who has been in the motor car field for the last twenty-five years, is vice-president and general manager, and Miss Mary Gallagher is secretary and treasurer. The branch now has an organization of ten salesmen, four service men and a night superintendent.

FORD R. R. ASKS TIME

WASHINGTON, April 16—The Detroit and Ironton Railroad, owned by Henry Ford, asked the Interstate Commerce Commission this week for an extension of time from Jan. 1, 1925, to Jan. 1, 1926, in which to complete the construction of a line from Durban, Mich., to Malinta, Ohio.

The road explained it has difficulty in acquiring the necessary right of way. It has now acquired all the land for the northern part of the road in Monroe and Lenawee Counties, Mich., with the exception of one parcel, and will begin construction within 60 or 90 days.

NO AJAX PRICE CHANGE

In the April 9 issue of AUTOMOTIVE INDUSTRIES it was stated that the Ajax Rubber Co. had adjusted prices upward some 3 to 5 per cent. Later information reveals that no change in price has been made by Ajax.

New England S. A. E. Elects Officers

BOSTON, April 13—Merl R. Wolfard was elected president of the New England Section of the S. A. E. at its annual meeting. The other officers chosen were Professor Edward R. Warner, Massachusetts Institute of Technology, vice-chairman; Lawrence Le Page, treasurer; E. O. Wheeler, secretary; Maurice Olley, chairman of the Springfield section; Professor E. H. Lockwood, chairman of the New Haven section.

J. J. Riley, sales manager of the automotive finish department, du Pont de Nemours Co., Parlin, N. J., was the speaker at the April meeting. He talked on the principles of Duco and its relation to other paints and varnishes in finishing motor vehicles. He explained how the finish was worked out, and the elements upon which it is based.

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February Shipments of Tires 2,176,762

Gain in Balloon Tire Output Reflects Increasing Demand

NEW YORK, April 15—In the month of February 2,940,656 cord and fabric tires were made, according to reports from members of the Rubber Association of America, representing about 75 per cent of the industry.

The February production was in excess of shipments, for 2,176,762 tires were shipped during that period. The January output was 3,008,611 and 3,278,674 in February, 1924. Shipments in January were 2,526,429 and February, 1924, showed 2,866,626 shipped. As a result inventories on Feb. 28 totaled 5,818,507, an increase of 757,497 over the number on hand at the end of January and 553,374 more than on Feb. 28 of last year.

The demand for balloon tires was reflected in the February shipments which totaled 764,874, a new monthly record for this type. January shipments of balloons came to 563,315 and December, 453,296. Based on the February figures, it is estimated that there was on hand about 1.1 months' supply of balloon tires.

Inventories of balloon tire inner tubes were 951,539 at the end of February compared with 920,728 at the end of January; production was 776,855 compared with 585,143 in January and shipments totaled 738,734 compared with 538,533 the month before.

Pierce-Arrow Opens Branch in Chicago

CHICAGO, April 16—Pierce-Arrow Motor Car Co., through its president, Myron E. Forbes, yesterday completed arrangements for the opening of a factory branch in Chicago. This branch will absorb the facilities of H. Paulman & Co., who has represented Pierce-Arrow in this territory since 1902.

As a result of the consummation of these plans, Mr. Forbes stated that an expansion program for the Chicago district will be rapidly put into execution. Arrangements along this line have been under consideration since the introduction nine months ago of the Series 80 models.

In taking over the interests of the Paulman company, Pierce-Arrow will continue to operate the present salesrooms on Michigan Avenue and also the service plant. A. A. Crumley will have charge of the plant, assisted by M. V. Porter. J. V. Lawrence and H. Paulman, owners of the company that is being taken over, have not announced their plans. Mr. Paulman has for years served as a director of the Chicago Automobile Trade Association, and the Illinois State Highway Association.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, April 15.

GENERALLY active trade, especially in retail lines, was reported last week. Further easing was noted in iron and steel production. Stock prices were fairly firm, with trading in smaller volume than at any time since the election. Commodity prices also were stronger than in recent weeks.

The initial estimate of the Department of Agriculture forecasts a winter wheat crop of 474,255,000 bushels, which compares with last year's crop of 590,037,000 bushels. The condition on April 1 is placed at 68.7 per cent of normal as against 83 per cent a year ago.

Car loadings in the week ended March 28 numbered 931,395, comparing with 909,363 in the preceding week and 907,543 in the corresponding period last year. Traffic in the first two months of this year was the largest ever recorded for a corresponding period.

Increases last month in production of pig iron and steel ingots, shipments and unfilled orders for passenger cars, deliveries of raw silk from warehouses, receipts of both foreign and domestic wool, sales at retail, incorporations, bank clearings and interest rates are shown in the preliminary summary of the Department of Commerce. Orders for freight cars, blast furnaces in operation, and the issuance of corporate securities were smaller than in February.

Final figures of pig iron production last month show an average daily output of 114,975 tons, comparing with 114,791 in February and 111,809 in March last year. The estimated output of steel ingots was 4,180,333 tons, as against 3,740,004 in the preceding month and 4,187,942 a year earlier, while the daily average of 160,782 tons compares with 155,833 in February and 161,075 in March, 1924. Unfilled orders reported by the United States Steel Corporation on March 31 amounted to 4,863,564 tons, as compared with 5,284,771 at the end of February and 4,782,807 a year ago.

Building contracts awarded in March in 36 States, according to the F. W. Dodge Corporation, amounted to \$480,916,300, as compared with \$433,340,300 a year earlier. The total for the first quarter is 4 per cent higher than last year's corresponding figure, despite a 32 per cent drop in the New York district.

Debits to individual accounts reported by the Federal Reserve Board for the week ended April 8 were 5.4 per cent below the total for the preceding week, but 17.4 per cent above that of a year earlier.

Electric Drive Bus Adopted in Albany

New Fageol Has Hall-Scott Engine and Two Electric Motors

ALBANY, N. Y., April 13—A new type of Fageol bus with gasoline-electric drive has been placed in service by the Capitol District Transportation Co., Inc., and is understood to be the first of an order for about 50 buses of the type which the concern mentioned has placed with the Fageol Motors Co.

The engine of the bus is a six-cylinder Hall-Scott and the drive is by the General Electric Co.'s system which was fully described in AUTOMOTIVE INDUSTRIES a short time ago, in connection with the order placed by the Philadelphia traction interests for gas-electric buses. There are two electric motors which drive through propeller shafts and underslung worm gears to the Timken rear axle.

The new bus has unusual headroom—78 in. at the front and 75 in. at the rear. A combined heating and ventilation system is provided, consisting of an air duct which leads from the engine compartment back underneath the floor of the bus, with a number of outlets into the body. Air enters this duct through a centrifugal type cleaner without moving parts and is delivered into the bus body either at atmospheric temperature or heated by exhaust heat, the exhaust pipe leading through the center of the air duct.

The bus is a single decker with capacity for 29 passengers. The engine is governed at 1750 r.p.m. and develops a maximum of about 90 hp. High speed electric motors are used and the reduction ratio of the final drive is 11 to 1.

More Price Cuts in English Car Prices

LONDON, April 7 (by mail)—Further price cuts in English car prices have been announced as follows:

	Old	New
TROJAN		
Chassis	£135	£115
4-seater touring	148	125
Chassis with pneumatic tires		120
4-seater coupe with pneumatic tires		158
4-seater with pneumatic tires		130
BEAN		
12 hp. chassis	285	245
HAMPTON		
12 hp. 2-seater all-weather	350	275
4-seater all-weather	395	295
Coupe	398	330
CHEVROLET		
5-seater tourer	160	155
DELAGE		
40-50 hp. chassis	1,075	1,125
PAIGE-JEWETT		
25 hp. de luxe touring	405	395
de luxe sedan	530	510
de luxe brougham	475	460

Men of the Industry and What They Are Doing

Grainger Heads Piston Sales

W. C. Stettinius, president and general manager of the American Hammered Piston Ring Co., announces the appointment of C. A. Grainger to the position of general sales manager, following the resignation of T. B. Blakiston as vice-president and general sales manager. Mr. Grainger, who has been with the company for some years, is well known throughout the industry. It is also announced that E. G. Erck, who has been with the company for the past five years, is now manager of the sales promotion department.

Bastien Goes with Stutz

Paul Bastien has joined the organization of the Stutz Motor Car Co. of America as aid to chief engineer Charles S. Crawford. Mr. Bastien was chief engineer of the Metallurgique plant in France for 12 years and for three years was designing engineer for Berliet. During his engineering career he has supervised the construction of 36 cars. Until his connection with the Stutz company he was engaged in consulting engineering work in this country.

Cairns Gets Oakland Post

G. V. H. Cairns has been named Atlanta district manager for Oakland Motor Car Co., succeeding A. G. Millard, who recently resigned. In 1908 he started as technical field representative for the Hudson Motor Car Co., was later with Paige, Krit and Saxon and entered the service in 1917 in the ordnance tractor division. He has lately been serving as assistant manager of the New York branch of Oakland.

Morse Named Export Head

Elliott G. Morse has been appointed export manager of the Maxwell Motor Corp. and the Chrysler Corp., succeeding H. M. Salisbury. Mr. Morse has been connected with the domestic sales department since joining the company in 1914, previous to which time he was sales manager of the Wills Sainte Claire Co. For some years he was with the John N. Willys Export Corp.

Flanagan with Thompson

R. K. Flanagan has been named district sales manager for the Pacific Coast for Thompson Products, Inc., with headquarters in San Francisco. Products handled are silchrome valves, bolts, bushings, etc. Flanagan was one of the organizers of the Pacific Coast Automotive Boosters' Club, which now has a membership of sixty manufacturers' representatives.

Berdon Joins Eisemann

A. E. Berdon has become associated with the Eisemann Magneto Corp., in the capacity of assistant chief engineer. He

was at one time research engineer for Dodge Brothers in Detroit and from 1917 to 1919 was with the Self-Feeding Vaporizer Corp. Until recently he has been production engineer for the Remy Electric Co.

Airships, Inc., Elects Officers

New officers and directors elected at the annual meeting of Airships, Inc., Hammondsport, N. Y., are as follows: J. Lansing Callan, president; Beckwith Havens, vice-president and treasurer; James F. Boyle, vice-president and secretary. Directors: T. F. Woods, C. D. Champlin and the officers of the company.

Pratt with California Durant

Charles C. Pratt is now special traffic representative for the Durant Motor Co. of California, according to an announcement from Norman de Vaux, vice-president and general manager of the company.

Dunham with Ace Rubber

P. G. Dunham is now works manager for the Rubber Ace Corp., in Elgin, Ill.

It is planned to extend the business of the Ace company and the development of its sponge rubber inner tubes.

Warrender Directs Turner Sales

L. S. Warrender was recently named traveling sales manager for the Turner Manufacturing Co. of Kokomo, Ind., maker of the Turner Timer and accessories.

Franklin Promotes Leyerle

F. J. Leyerle has been named assistant to the president of the Franklin Automobile Co. Until recently he was service manager for the company.

Barnitz Joins Mack Staff

Fred B. Barnitz has joined the sales staff of the Mack-International Motor Truck Corp. He was formerly connected with the Foss-Hughes Co.

Goodwin on Commission

William H. Goodwin, manager of the Ford Motor Co. of San Francisco, has been appointed to the San Francisco City Traffic Commission.

Mail Contracts Said to Interest Fords

WASHINGTON, April 16 — Henry Ford and his son Edsel are taking a lively interest in the letting of contracts by the Post Office Department, it was admitted here this week by Second Assistant Postmaster Paul Henderson, who has this in charge.

Mr. Henderson stated that he has just returned from Detroit where he conferred with the Fords and nearly a score of others who are interested with them in the development of aviation. He outlined in Detroit the regulations which contractors will be forced to work under.

"I am very much impressed with the progress that the Fords are making in commercial aviation," he said, "and I am hoping that they will decide to bid on some of our contracts when they are advertised. Reliability and responsibility of the bidder are among the three major requirements as set down in the act of Congress authorizing this service."

GOODRICH RETIRES SHARES

NEW YORK, April 15—Stockholders of the B. F. Goodrich Rubber Co. at the annual meeting approved the retirement of 23,760 preferred shares acquired by the company, leaving a total of 424,720 shares outstanding. President B. G. Work said that the directors had taken no action regarding the resumption of common dividends, since it was considered inexpedient to commence disbursement under the circumstances un-

til a more substantial surplus had been accumulated. He said that sales volume for the first part of this year was about the same as in the corresponding period of 1924.

NEW POLISH DEVELOPED

WILMINGTON, DEL., April 15—A special polish for the new type of pyroxylin finish used on automobiles has recently been perfected and placed in the market by E. I. duPont de Nemours & Co. The new polish is said to be sufficiently abrasive to remove tiny irregularities, and yet is amply protective to the delicate luster characteristic of the finish. It is also claimed that the polish is easily applied, dries rapidly and leaves a film to which dust will not adhere readily.

Anderson Made Head of Rim Association

CLEVELAND, April 14—J. D. Anderson was elected president of the Tire and Rim Association at the recent annual meeting, held in this city. Other officers of the association are W. B. Minch, vice-president; H. W. Kranz, treasurer; C. E. Bonnett, secretary and general manager; H. W. Day, assistant secretary.

Production for the first three months of 1925 totaled 6,115,954 rims approved, according to a bulletin announcement of the association. The total rims approved in 1924 numbered 21,863,815 and 1923 showed 23,141,962.

Discuss Changes in Crating Regulations

N. A. C. C. Officials Confer with Emergency Fleet on Car Boxing

WASHINGTON, April 14—Plans for modification of shipping and crating regulations for export automotive shipments were taken up this week by the Executive Committee of the National Automobile Chamber of Commerce with officials of the Emergency Fleet Corporation, the Association discussing with the Corporation the possibilities of shipping automobiles without crating.

If this could be done it would mean a saving to the foreign purchaser of approximately 13 per cent on the cost of the low and medium priced cars and even a greater saving on heavier and more expensive makes. The aggregate saving to the industry in the cost of crating, freight charges, etc., would be approximately \$13,500,000 annually the Corporation was told.

Average Crating Cost \$40

Figures were submitted showing that the average cost of labor and crating an automobile is \$40, while for some makes it runs as high as \$65 per car. If this cost could be eliminated it would not only represent a saving for both the shipper and the foreign purchaser but would also represent an additional saving in the tariff import duties in many countries.

In many countries, it was explained, the import duty on cars is based on the weight and in such cases the purchaser must not only pay the duty on the weight of his shipment, but on the weight of the crating.

That automobiles can be successfully shipped without crating was cited to the Corporation by the manufacturers who cited the case of the Madison Line to Hawaii and the Ward Lines to Central America countries. The estimated total saving of \$13,500,000 in shipping cost, was based by the manufacturers on last year's movement of 386,000 cars and trucks sold abroad.

Shipping to 114 Countries

In discussing the possibilities of shipping cars without crating them, Alfred Reeves of the N. A. C. C., declared that the manufacturers are now shipping cars to 114 different countries.

"Last year we shipped from 10 to 12 per cent of our production, to foreign fields. This year we will export about 15 per cent and in the future the manufacturer will probably sell abroad 25 per cent of his production.

"The saving in shipping cost will be enormous and while today's conference with the Fleet Corporation is largely preliminary, they have assured us that the matter will be taken under advisement."

Executives of the corporation told the

automobile representatives that the matter of shipping would be largely dependable on a survey of the corporation's individual ships as many of the ships are not so constructed that the unit can be shipped assembled. An effort will be made, however, it was said, to divert suitable ships to the major lines which would make this possible and it is the expectation of both the Government officials and the automobile manufacturers that some plan can ultimately be worked out for at least the major ports of foreign shipments.

Those who attended the conference included:

B. A. Laing of General Motors Export Corporation; M. C. Reickert, Studebaker Corporation; J. J. Palmer of Dodge Brothers; George F. Bauer of the N. A. C. C.; H. H. Rice, president, Cadillac Motor Car Co.; R. E. Olds, chairman of the Reo Motor Car Co. Board; Windsor T. White, chairman of the Board, White Motor Co.; David S. Ludlum, president of the Autocar Co.; A. T. Waterfall, vice-president, Dodge Brothers; M. L. Pulcher, president, Federal Motor Truck Company; T. R. Dahl, vice-president, the White Motor Co.; George H. Pride, the Autocar Company; Alfred Reeves, general manager, N. A. C. C. and Pyke Johnson, Washington represent of the Automobile Chamber.

Changes Recommended in Anti-Trust Laws

HOT SPRINGS, ARK., April 13—A resolution favoring the changing of the anti-trust laws so, as to permit agreements of cooperation among merchants which are economically useful was passed by the Board of Directors of the Automotive Equipment Association at its mid-convention meeting here.

In the resolution, the board expressed its belief that the Clayton Act and the Federal Trade Commission Act, passed in 1914, have failed to accomplish the purpose for which they were passed. Many automotive firms, the resolution said, are still laboring under the condition imposed upon them by the Sherman Anti-Trust Act and its misinterpretation by various judges.

Copies of the resolution were sent to the President, Vice-President pro-tempore of the Senate, Speaker of the House of Representatives, Attorney-General, Secretary of Commerce and to individual members of the Senate Committees on Judiciary and on Interstate and Foreign Commerce, to individual members of the House of Representatives Committees on Judiciary and Foreign Affairs and to each member of the Senate and House.

Arrangements for the November show were given a start with the naming of the show committee consisting of F. B. Caswell, chairman, Champion Spark Plug Co., Toledo; T. N. Williams, Peasle-Gaulbert Co., Louisville; N. F. Ozburne, Ozburne-Abston Co., Memphis; W. G. Pancoast, Biflex Corp., Waukegan and M. S. Gooderham, Toronto Auto Accessories Co., Toronto.

Maxwell Corp. Earned \$4,115,540 in 1924

Statement Reflects Development of Chrysler Car—Working Capital Doubles

NEW YORK, April 15—The annual report of the Maxwell Motor Corp. for 1924 shows earnings of \$4,115,540, or \$3.56 per share on the outstanding 617,948 shares of no par Class B stock, after allowing for the 8 per cent dividend on the A shares.

In the first six months of last year Maxwell showed net earnings of under \$500,000, due to the expenditures in connection with the development of the Chrysler car, which was at that time a new product on the market. Although some of the development expenses were carried into the second half of the year, still the majority was charged against the first six months.

Then with the Chrysler car in increasing production during the latter part of the year, earnings began to climb steadily, reaching a peak of \$1,000,000 for October and setting an average monthly net of nearly \$600,000 for the last half.

While figures have not been published for the current year, it is understood that earnings, especially the last month or two, are exceeding all previous records.

The 1924 statement shows a gain of more than \$6,000,000 in cash assets, while cash and sight drafts totaled \$8,684,826, as against \$2,465,331 at the end of 1923. Current assets, including inventory of \$11,398,161, totaled \$23,029,398 as against current liabilities of \$6,763,494, making net working capital \$16,265,904, compared with \$8,420,475 reported at the end of the previous year.

Canadian Derby Car Production to Start

SASKATOON, SASK., CANADA, April 11—Derby Motor Cars, Ltd., expects to commence manufacturing operations at Saskatoon, Sask., toward the end of April, employing at the beginning from 20 to 30 men and eventually increasing the payroll to about 100. The company has a contract with the George W. Davis Motor Car Co., Richmond, Ind., which gives it the sole right to import the Davis car in units, assemble it and market it in Canada and abroad under the name "Derby." Their estimated output for the present year is from 250 to 300 cars. The company is capitalized at \$1,500,000, of which \$500,000 is preferred and \$1,000,000 common stock. The officers are L. N. Arsenault, president and general manager; F. E. Betts, vice-president and assistant general manager; C. E. Meadows, treasurer, and E. A. Brodeur, secretary.

Sale of Dodge Bonds Completes Financing

New Charter Filed in Maryland
—Title Will Be Passed to
Bankers May 1

NEW YORK, April 15—Financing of Dodge Brothers, Inc., following the recent purchase by Dillon, Read & Co., was completed Saturday morning by the sale of \$75,000,000 debentures. Subscriptions to the offering totaled, it was stated, \$150,000,000, and the books were closed soon after they were opened at 10 o'clock.

A charter for the new corporation, formed after the purchase, was filed with the State Tax Commission of Maryland, accompanied by an incorporation or bonus tax of \$8,480 paid to the commission. This is the largest industrial corporation ever formed under the Maryland laws. The charter provides for the issuance of a total of 3,885,000 shares of no par stock.

It has been announced by the bankers that the title of Dodge Brothers, Inc., will pass to them on May 1, at which time a check for \$146,000,000 will be sent to the trustees for the estates of John F. and Horace Dodge. From Detroit comes the statement that Dodge heirs and others closely identified with the management of the company have subscribed for more than \$5,000,000 of the preferred stock that was offered last Thursday. While this does not represent in its entirety money being paid for the company, still it is contended

G. M. Sales in March Total 70,492 Cars

NEW YORK, April 16—The sales of General Motors cars by dealers to ultimate consumers in March totaled 70,492 cars and trucks, compared with 57,205 in March, 1924, and further with 39,579 in February, 1925. These preliminary figures include passenger cars and trucks sold in the United States, Canada and overseas by the Chevrolet, Oldsmobile, Oakland, Buick, Cadillac and GMC Truck divisions.

Sales of cars and trucks to dealers by manufacturing divisions of General Motors in March totaled 75,585, compared with 75,484 in March, 1924, and further with 49,146 in February, 1925.

The following tabulation shows sales of General Motors cars by dealers to ultimate consumers, as well as sales by manufacturing divisions of General Motors to their dealers:

	1925		1924	
	Sales to Users	Sales to Dealers	Sales to Users	Sales to Dealers
January	25,593	30,642	33,574	61,398
February	39,579	49,146	50,007	78,668
March	70,492	75,585	57,205	75,484

that a major portion of it does represent a reinvestment in the business.

The new debentures were immediately listed on the Stock Exchange, opening at 99½ and selling up to 99½. Most of the trading was done at 99½.

The offering was made Saturday morning because of the desire of the bankers to complete the operation and make way for other pending financing. The Dodge bond issue was given right of way by mutual consent. Bankers stated that the offering group alone could have easily placed the entire issue, if the subscription book had been permitted to remain open for any length of time.

Holyoke Tire Maker Files Assignment

HOLYOKE, MASS., April 13—The New England Tire & Rubber Co., maker of the Holyoke tire, filed an assignment today for the benefit of its creditors. The assignees named are Herbert W. Pattee, Boston, Walter W. Slack, Springfield, Vt., and L. Alphonse Laporte of Holyoke.

The company started business here a couple of years ago, organizing with a capital of \$3,000,000 and a large amount of the stock was sold in the Connecticut valley. It had secured distributors through the New England territory and did some extensive advertising more than a year ago. Mr. Laporte is treasurer of the company, and in a statement issued today he said that the directors had concluded after consideration of the financial affairs of the company, that an assignment was the best way to conserve the assets of the corporation for the benefit of its creditors and stockholders. Within a few days there will be a meeting of both interests at which the assignees will seek to map out plans for the future guidance of all concerned.

BUS OWNERS ORGANIZE

INDIANAPOLIS, April 13—The Inter-City Truck Haulers of Indiana have recently organized in order to take common action in beginning operation under the recently passed public utility law, which will regulate buses and trucks acting as common carriers. A series of meetings have been held in this city and one in Kokomo. Three committees have been appointed to study pertinent questions and to formulate the proper means for cooperation with the Public Service Commission in putting the new act into effect.

DOMINION ANNOUNCES CUT

MONTREAL, CAN., April 14—A new price list recently issued by the Dominion Rubber System, Ltd., announces a reduction in 30 x 3½ Royal cord tires by about 15 per cent. No changes have been made in other sizes, and the reduction is announced as being based on ability to secure lower production costs through the increased demand.

Plan S. A. E. Dinner Before Annual Race

Indiana Section Has Secured
Well-Known Speakers for
Event Before Contest

INDIANAPOLIS, April 14—The Indiana Section of the Society of Automotive Engineers has voted to give an Anniversary and Welcoming Dinner the night before the 500 Mile Race, May 29, to visiting S. A. E. members and industrial leaders of the automotive industry. Maj. Gen. Mason E. Patrick, Chief of the Air Service, Charles E. Schwab, and C. K. Kettering, president of the General Motors Research Corp., have already accepted invitations to speak on various phases of progress made by the automotive industries in the last 25 years.

The Indianapolis Athletic Club directors have offered the club's main dining room for the dinner, and the Indianapolis Chamber of Commerce will collaborate with the local S. A. E. Other speakers will probably be announced shortly.

Among the special guests to be invited are Edgar Apperson, Orville Wright, Harry Horning, president of the S. A. E., Col. Charles Clifton, president, and Alfred Reeves, manager of the N. A. C. C., Maj. Gen. Dwight E. Aultman, Commander of the 5th Corps, U. S. A., and other officers from Ft. Ben. Harrison, and Henry and Edsel Ford.

A large block of seats for the race has been reserved for members of the national S. A. E. and members of other sections to whom special invitations are to go shortly. These seats will be held until responses from the invitations have time to reach Geo. T. Briggs, chairman of the section in charge of the dinner. He is assisted by Fred E. Moskovics, president of the Stutz company, in planning the dinner and securing the speakers.

Canadian Goodyear Output Increases

TORONTO, ONT., April 14—Another payment of deferred dividends on the preferred stock is being made in conjunction with the regular dividends on both the preferred and prior preference stock of the Goodyear Tire & Rubber Co. of Canada, Ltd. This announcement was contained in a letter addressed to the shareholders of the company by C. H. Carlisle, vice-president and general manager, who states that for the last six months of the current fiscal year the company's production has exceeded that of any similar period since the company has been in business.

Operations are carried on to full capacity on a 24 hour day basis. It is also stated that while margins of profit are exceedingly small the profits for the last six months are greater than those of the same period a year ago.

Ford Air-Freighter Makes Maiden Trip

Stout All-Metal Plane Makes
Detroit-Chicago Trip with
Cargo

DETROIT, April 14—Maiden Dearborn, a Stout metal airplane, started commercial aviation on a regular schedule yesterday when it made a trip to Chicago and return, carrying over 1000 pounds of freight for the Ford Motor Co.

Piloted by Edward Hamilton, former Royal Air Force aviator, the plane made each leg of the journey in 2 hr. 13 min.

The craft used is the first of two which will shortly be in use, and it is expected that others will soon be added. Henry Ford asserted that, while the Detroit-Chicago schedule is, in a measure, an experiment, that "ultimately we hope to link our plants in Chicago, St. Louis, St. Paul and Iron Mountain, Mich., with air transportation lines similar to this one. The hydro-electric plant at St. Joseph will be connected with the plant in St. Louis, which, in turn, will be connected with the Chicago plant. Detroit will be a terminus for the Chicago and Iron Mountain lines. Inter-factory mail will probably make up much of the cargoes of these ships. Urgent shipments of small parts, for which a sudden need arises, will constitute a part of the loads, however."

Fatalities Statistics Undergo Revision

WASHINGTON, April 16—A number of cities have objected to the comparative fatality statistics presented by the Bureau of Census to the National Conference on Street and Highway Safety, according to reports received by Secretary of Commerce Hoover as chairman, it is announced here. These objections are due to the fact that the figures credit to the cities the total number of deaths occurring within their limits which are the result of street and highway accidents, but do not differentiate between deaths resulting from accidents which occurred within the corporate limits and deaths which resulted from accidents occurring outside the city limits.

Recognizing the justice of these complaints the Bureau of the Census some months ago began the preparation of a plan for dividing these two classes of fatalities in their records. It is now proposed that in the reports received from State and local registrars in the registration area they shall show, not only the cause of deaths, from automobiles, but the place where the accident occurred. This will enable the bureau in tabulating these fatalities to charge the death to the location where the accident actually occurred, and not to the community where the victim died.

A circular letter describing this sit-

uation and requesting cooperation has been sent to the registrars of all States. There are seven States within the registration area which have not as yet pledged full cooperation with the bureau.

G. M. 1924 Freight Over \$42,000,000

NEW YORK, April 15—In 1924 the freight charges upon General Motors cars and trucks and the material from which these automobiles were made amounted to over \$42,000,000. This does not include the freight paid on material shipped to the company by over 3000 different concerns.

General Motors last year sold 587,341 automobiles consisting of Buick, Cadillac, Chevrolet, Oakland, Oldsmobile and GMC trucks. Of this number approximately one-quarter were driven away from the plants and the remainder shipped by railroads.

The number of freight cars required to bring the raw materials into the General Motors plants and carry away the finished automobiles, together with the tonnage in pounds, is as follows:

	No. of Carloads	Carload Tonnage
Inbound	94,889	5,267,103,398
Outbound	154,467	2,494,318,381
Totals	249,356	7,761,421,979

If there is added to the number of carloads shown in this table the less-than-carload lots it brings the total up to 280,051 freight cars—the equivalent of 4700 freight trains of 60 cars each. Put end to end these trains would reach a distance of 2423 miles.

ILLINOIS EMPLOYMENT GAINS

CHICAGO, April 15—The automotive industry in Illinois led all other industries of the State in the percentage of gain in employment in February, as compared to that of January, according to figures just announced by R. D. Cahn, chief statistician of the Illinois Department of Labor. The gain for the automobile industry was 11.6 per cent, 5½ per cent better than the next industry.

Figures being compiled from questionnaires returned by 29 automobile and accessory firms show an increase of 305 employees for the past month, as compared with February. The industry in this State employed 8320 men and women in February and 8625 in March. Employment in March, 1924, however, was higher, there being 8984 workers in that month.

McCord Reports Quarter

NEW YORK, April 15—McCord Radiator and Manufacturing Co. reports net earnings of \$222,056, after all charges and Federal taxes, for the first quarter ending March 31. According to an official of the company, indications are that the second quarter will make an even better showing.

Ford Aviation Plans Rapidly Expanding

Work Started on Service Station
at Airport—Includes Mast
for Dirigibles

DETROIT, April 15—A general expansion program has been started at the Ford Airport coincident with the beginning of the Ford triweekly commercial air service between Detroit and Chicago.

Work has been started on a new building at the field, which is to be the service station for the commercial planes. It is 65 by 200 ft. and is designed to contain a gas and oil station, pilots' quarters, repair shop, meteorological laboratory and radio transmitting and receiving apparatus. The new building is about 1200 ft. distant from the production plant, and the two will be connected by a concrete apron, which will provide hangar space for the planes at the field.

A contract has been let for a mooring mast for dirigibles, and work on this will start shortly. Although the service which began this week is primarily designed to carry Ford company mail and emergency parts and material, it will provide invaluable data as to the cost of such a service and the possibility of carrying express freight on a commercial basis. Due to lack of experience with services of this kind, it has been difficult to calculate just what will have to be charged for freight in order to make the service pay. After the plane now being completed at the Stout factory at Ford Airport is turned into the Detroit-Chicago service, work will be started immediately on about five more planes, and with these another route will

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YELLOW CAB EARNINGS

CHICAGO, April 15—Net earnings of the Yellow Cab Manufacturing Co. for 1924 were \$2,742,408, after taxes and all charges, including \$869,543 for experimental development. This was equivalent to \$4.49 a share on the 600,000 shares of Class B stock.

Net profits were below dividends paid during the year, due to a quarter of the earnings being expended in experimental work and some decline in earnings. Last December the annual dividend was reduced from \$5 to \$2.52 a share. As the dividend reductions did not take effect until this year, there was a deficit of \$180,842. This, together with an income tax adjustment, was made up from surplus that accordingly declined \$203,261 to \$4,304,081.

"We have just passed through the period of experiment," said President John Hertz, "and are now reaping the benefits of this work. Net income for the first quarter of this year will be about \$625,000, which is \$235,188 in excess of dividend requirements."

Research Started in Engine Lubrication

S. A. E. Conducts Research with
Manufacturers in Motor
Usefulness

NEW YORK, April 14—With the cooperation of a number of manufacturers and the Bureau of Standards, the Research Committee and Research Department of the Society of Automotive Engineers have begun a concerted attack on the problem of internal wear in automobile and truck engines, with the object of increasing the period of usefulness of motor vehicles to their owners.

Various lubrication problems that are common to all machines are considered of enough importance by several manufacturers to warrant a careful analytical study. Among the companies that are taking part in this movement are the Autocar, Chevrolet, Chrysler, Dodge, Mack, Maxwell, Packard and Rickenbacker.

Samples Analyzed

The method that is being followed is for the companies to send to the Bureau of Standards samples of used lubricating oil taken from the crankcases of cars and trucks operating in regular service in different cities. The samples are being taken from ten cars each in Washington, Detroit, Birmingham, Minneapolis, New Orleans, Tulsa and San Francisco. These cities were selected as representing the desired variation in climatic conditions and other factors, such as the dust carried in the air that the engines must breathe. The 170 samples so collected will be analyzed completely at the bureau to obtain an index of the wear of cylinder walls, piston rings and crankshaft and connecting-rod bearings that results from the presence of various materials that contaminate the oil in the engine, such as dust, water and the heavy ends of hydrocarbon fuels.

Will Compile Summary

Results of the analyses will be furnished to the cooperating manufacturers and a summary of the investigation will be compiled later for the information of all concerned. Positive knowledge of the materials that impair the lubricating quality of oils and cause most wear will enable the manufacturers of cars and trucks to devise means for increasing the life of motor vehicles.

This new undertaking is a continuance of the study of the lubrication problem which the Society of Automotive Engineers has been carrying on for several years in conjunction with the Bureau of Standards, the National Automobile Chamber of Commerce and the American Petroleum Institute. The problem has been complicated by the use of certain types of fuels, including those of low volatility that do not burn completely in the cylinders, as the unburned fuel

makes its way into the crankcase and dilutes the lubricating oil. This lowers the viscosity of the oil, making it less effective as a lubricant. Water and dirt also decrease the lubricating value of crankcase oils.

Rutherford Confers with U. S. Officials

WASHINGTON, April 14—To discuss matters of mutual interest to the national government and the automotive industry, W. O. Rutherford, vice-president of B. F. Goodrich Rubber Co., was here for a series of meetings with government officials. Topics pertinent to the cooperation of the government and the automotive industry, he stated, would be reviewed.

Mr. Rutherford declared that closer cooperation between the heads of industries and government officials has resulted in many benefits to everybody concerned. He added:

In one case the cooperation between the Rubber Association, and The United States Department of Commerce has helped greatly to avoid periods of curtailment in the tire industry. Through the resulting ability of the industry to maintain a uniform production a program of marked economic benefit has bettered conditions in the trade to such an extent that the public has gained many material advantages in the way of tire quality and price.

The Department of Commerce is at present engaged in making a survey of tire stocks in dealers' hands. On the basis of this information the manufacturers and dealers can gauge the possible tire consumption within the next few months, and the danger of over-production in the industry is thus avoided.

NEW JEWETT COACH

DETROIT, April 16—Paige-Detroit Motor Car Co. is in production on a new Jewett coach model, listing at \$1,260. It is finished in dark blue lacquer and is upholstered in plush. The doors are 36 in. wide, affording easy access to the rear seat.

Ford Aviation Plans

(Continued from page 722)

be opened, possibly between Detroit and Cleveland.

This is proposed as a purely commercial service, freight to be accepted from the shipping public at large.

The Ford-Stout development is officially stated to be entirely independent of the plans of American Airways, Inc., which is for other commercial services. The American Airways project was initiated by a New York group, although its first meeting was held at the Stout factory, and several automobile men in Detroit are interested. There is a probability that the Stout plane will be used by the American Airways service, which will be opened between New York and Chicago some time this summer, if present plans are brought to fruition.

Program Completed for Tractor Meeting

Agricultural Engineers Join with
S. A. E. in Plans for Chi-
cago Convention

NEW YORK, April 13—This year's national tractor meeting is to be held in Chicago on April 29 and 30, at the Great Northern Hotel, under the joint auspices of the Society of Agricultural Engineers and the Society of Automotive Engineers. The agricultural engineers are to hold their sessions the first day, and the automotive engineers will discuss their problems on the second day, beginning at 10 a.m. An informal luncheon, at which several tractor pioneers will speak, will occupy the interval between the forenoon and the afternoon sessions.

A series of motion pictures showing the developments and applications of farm tractors will be exhibited during the evening of the 29th to members of both societies and their guests. After the technical sessions visits will be made to the experimental farm of the International Harvester Co. at Hinsdale and the Samuel Insull Hawthorn Farm at Libertyville, both near Chicago, where power-operated machinery in regular and experimental use will be seen in action.

Topics Announced

Engineering papers of real value to tractor designers and builders are included in the program of the S. A. E., and opportunity will be afforded for extensive discussion of the different subjects. Among the speakers will be H. L. Horning, president of the society and president of the Waukesha Motor Co., who will deliver an address on tractor engine research, with special reference to the problems of combustion, lubrication, clean air and lubricating oil dilution.

George D. Babcock, manufacturing executive of the Holt Manufacturing Co., and Max Slovsky of the John Deere Co. are to give papers on "Recent Developments in Production Methods and Equipment."

Will Discuss Ford Tractors

A paper of unusual interest on the influence of tractor engine development on automobile, truck and motor bus engine design is to be presented by L. B. Sperry of the International Harvester Co. Details relating to various phases of the tractor activities of the Ford Motor Co., which have always been of great interest, are to be presented, and E. W. Stewart of the Gibson Spring Co. is on the program for a paper on "Calculation and Design of Coil Springs."

O. B. Zimmerman of the International Harvester Co., Chicago, is chairman of the committee in charge of the meeting for the Society of Automotive Engineers.

Commission Named to Argentine Congress

Seven Nationally Known Men
Appointed for Meeting in
Buenos Aires

WASHINGTON, April 16—President Coolidge this week named seven men nationally known in the field of highway transportation as members of the Commission to represent the United States at the Pan-American Road Congress to be held at Buenos Aires, Oct. 3 to 13.

Members of the commission are: J. Walter Drake, Assistant Secretary of Commerce, chairman; Charles M. Babcock, Commissioner of Highways, Minnesota; F. L. Bishop, Dean, School of Engineering, University of Pittsburgh; Congressman William E. Hull of Illinois; Thomas H. MacDonald, Chief, United States Bureau of Public Roads; Frank Page, chairman, North Carolina State Highway Commission; and Dr. G. A. Sherwell, Secretary-General, Inter-American High Commission.

In the selection of the official delegation the President has further assured Argentina in particular and Latin America in general of the desire of this country to interchange views on highway transport, by naming a group of men who have made lifelong studies of the problem.

J. Walter Drake, Chairman

Mr. Drake, former chairman of the board, Hupp Motor Car Corp., was connected with the motor industry in an executive capacity for many years prior to his entrance into official life. It was through his initiative that the Pan-American Commission was brought to this country last year.

Mr. Babcock has been president of the American Association of State Highway Officials and is now chairman of the executive committee of that body. The "Babcock Road Plan" of Minnesota has attracted international attention.

Dean Bishop is secretary of the Society for the Promotion of Engineering Education and high in the councils of several national, technical and educational organizations.

Congressman Hull has played a large part in the development of highways since 1910. He is nationally known also as an exponent of water way measures.

Mr. MacDonald has been in State and Federal highway service since his graduation from college in 1904. He is one of the leading highway authorities of the world.

Mr. Page, a brother of the late Walter Hines Page, Ambassador to Great Britain, is one of the outstanding figures in highway work in this country.

Dr. Sherwell has been prominently identified with Pan American relations since 1915. He accompanied the Pan American Highway Commission in this country and has since delivered ad-

resses on the social effects of highways to audiences of leading Latin authorities in South America.

While plans for the delegation's trip have not been formally determined, it is probable that brief visits of inspection will be made at several countries en route to Buenos Aires. A large unofficial delegation made up of men interested in highway transport will attend the conference from the United States and it is expected that similar delegations will be present from all other countries of the Union.

The official program will be educational in character and will include discussions of best practices in matters relating to the construction, maintenance and use of highways as well as problems of finance, administration and regulation.

1925 Shows Decrease in Motor Fatalities

NEW YORK, April 13—Motor fatalities during the first two months of 1925 in the United States were 9 per cent under the same period of last year, according to a recent announcement of the Traffic Planning and Safety Committee of the National Automobile Chamber of Commerce.

George M. Graham, chairman of the committee, stated in the bulletin:

Strong public sentiment in support of the traffic officer is essential if traffic is to be controlled safely and efficiently. The policeman has a superhuman job. No group of officers could begin to handle the crime situation if the average man were criminal, yet there is a tendency on the part of the driver to ignore the motor law if the officer is not looking.

Facts compiled for the first time show that in our cities there are 7,150 persons and 1,470 motor vehicles to every traffic officer. But no city can put on enough traffic men to begin to handle the traffic situation unless the citizens, whether driving or walking, realize that they have a common job in getting the best and most efficient traffic regulation.

It is further stated in the association announcement that there is one traffic officer to every 3000 persons in Los Angeles, 10,000 street intersections in Detroit, 1129 miles of streets in Cincinnati, 250 "silent cops" in Atlanta, 534 traffic police in Chicago.

No Brown Merger

COLUMBUS, OHIO, April 14—Negotiations looking toward merging the John W. Brown Manufacturing Co., Columbus, with the C. H. Hall Lamp Co., Detroit, are definitely off, it was announced by John B. Brown, president of the former concern. No change in the ownership of the Columbus plant, or in its operation, now is contemplated, he said.

Recently plans were approved by directors of the Detroit concern to merge the Brown company. Stockholders, however, meeting last week, voted against this action. Exchange of Brown stock, share for share for Hall stock, was the plan in mind in the merger.

FINANCIAL NOTES

Fageol Motor Co. stock is now listed on the San Francisco Stock and Bond Exchange. There are 20,000 shares of common stock of \$10 par value, of which 198,696 shares are issued and outstanding. The preferred consists of 100,000 shares of \$10 par value, of which 83,122 shares are issued and outstanding. The preferred bears 7 per cent interest, is cumulative and callable within ten years at \$11 per share.

Motor Wheel Corp.—April 8 the New York Stock Exchange admitted to the list 489,458 shares of no par common stock.

Canadian Consolidated Rubber Co., Ltd., reports for year ending Dec. 31, 1924, sales of \$13,749,497, giving a balance after preferred dividends of \$539,457.

Ford Motor Co. of Canada, Ltd.—Holders of Investors Share and Unit Corp. trustee certificates for Ford Motor Co. of Canada, Ltd., Bankers Shares, were notified that Irving N. Fisher of New York has accepted the appointment as trustee of the certificates.

Delco Light Co.—Factory shipments for the first quarter of 1925 had a retail sales value of \$7,100,000, which was double that for 1924. In March the sales totaled \$3,800,000, a gain of \$2,000,000 over the same month a year ago.

C. L. Best Tractor Co. paid on April 4 an extra dividend of 25 cents a share, and the regular quarterly dividend of \$1.25 a share on the common stock to holders of record April 1, 1925. On Jan. 2, 1925, a similar extra dividend was paid on the common.

New Coast Decision on Interstate Buses

SAN FRANCISCO, April 11—Automobile stages operating in interstate traffic appear to have been overlooked by the Interstate Commerce Act, according to a recent decision of the California State Supreme Court, based on two prior decisions of the United States Supreme Court. Under this decision, an interstate stage line, though using the highways of California without paying any taxes toward the upkeep of those highways, may reduce rates under the rates of those lines that do pay taxes, and need pay no attention whatever to the regulations set up by the State railroad commission.

This condition applies, however, solely to motor stage lines engaged in interstate traffic. Over these, so long as they carry no passengers between points within the State, the railroad commission has no jurisdiction, according to the Supreme Court decision. In connection with these lines, then, the railroad commission cannot enforce the established California policy of permitting no destructive competition between public utilities. Such interstate stage lines may make their own rates, and may enter into any sort of competition for interstate business. If the owner of such a stage line lives in another State, his cars use and wear out the California highways without paying anything except the gasoline tax and the small license fee.

Program Ready for Service Convention

Prominent Speakers Listed to Talk at N. A. C. C. Meet in Detroit

NEW YORK, April 14—The program for the National Automotive Service Convention to be held in conjunction with the Automotive Maintenance Equipment Show, May 20-23, in the General Motors Building, Detroit, was announced here today by H. R. Cobleigh, secretary of the service committee of the National Automobile Chamber of Commerce.

A general invitation is extended to the entire automotive trade to attend the convention and the show, both of which will be open free to all dealers, service managers, shop proprietors, distributors and their employees. For this reason the topics selected for discussion at the convention are of a nature that will prove of particular interest to the trade.

Each session of the convention will be opened by a man of national prominence and the speakers following him have been selected because of their accomplishments in the particular phase of service which they will discuss.

One of the outstanding features of the convention will be the painting of an automobile ready for the road in one hour to show the possibilities of the new nitrocellulose lacquer finishes in helping to move used cars. The various stages in applying a complete lacquer finish starting from the bare metal also will be demonstrated.

The convention program which will have "Service at a Profit" for its keynote, follows:

May 20

Opening Address—Alvan Macauley, chairman of the N. A. C. C. service committee and president of the Packard Motor Car Co.
Personal Equation in Service Profit—Howard A. Coffin, assistant to president, Cadillac Motor Car Co.

Service Station Management—J. E. Mills, service manager, Detroit branch of Packard Motor Car Co.

Engine Reconditioning—Grinding, Honing,

Wheel Service Organized

NEW YORK, April 13—Wheels, Inc., has been formed to represent the Wire Wheel Corp. of America and Motor Wheel Products in the New York territory. Rather than a new company this will be an amalgamation of the existing organizations since the personnel of both companies will be retained.

Thomas J. Wetzel is president, Peter F. Minnaugh vice-president, Joseph A. Schrafel secretary, Lester F. Godsell assistant secretary, and John F. Creamer treasurer.

Wheels, Inc., plans to offer to motorists and the trade a new service similar to the battery rental service. Whenever necessary wheels will be rented or loaned while necessary repairs are being made.

Boring and Rolling Compared—N. W. Durin, vice-president of Houpert Machine Co.

May 21

The Place of Service in Industry—Capt. E. V. Rickenbacker, vice president of Rickenbacker Motor Co.

My Methods of Selling Service—By a prominent dealer, name to be announced.

Making a Success of Flat Rate and Piece Work—William G. Gow, general service manager, Studebaker Sales Co., Newark, N. J.

May 22

Making the Service Department Pay—C. E. Gambill, president, National Automobile Dealers Association, and Gambill Motor Co., Inc., Hupmobile distributor, Chicago.

Training Repairshop Personnel—J. F. McDonald, service manager, Ohio Buick Co., Cleveland.

Why Paint Is Greatest Aid in Selling Used Cars—L. Clayton Hill, Valentine & Co., Detroit.

Will Consider State Highway Marking

WASHINGTON, April 15—The Joint Board of Interstate Highways, recently appointed by the Secretary of Agriculture at the request of the American Association of State Highway officials, and composed of State and Federal highway officials will hold its first meeting here next Monday. At this meeting the scope of the work will be determined and the method of handling it decided upon.

The purpose for the creation of the board was to establish a uniform method of designating and marking interstate highways. As a result of the forthcoming conference many States have notified the Federal Government that they are withholding orders for highway signs pending the decision of the board in regard to the colors to be used. Some thirty State highway officials are expected to attend the meeting.

REGULATE BUS LINES

ST. PAUL, MINN., April 14—For the first time in the history of the bus business in Minnesota it is to be regulated by State control. The bus bill awaits only the governor's signature to become a law. The control is placed in the State Railroad and Warehouse Commission, and the 50 bus companies will have to get licenses to operate their 600 buses within 30 days after the bill is signed.

The law will require every bus company operating in the State to apply for a license for each route, showing public necessity for the route and public convenience. The commission will establish routes and fix the fare rate in which will be considered the effect of the service on the railroads.

NEW OLDS COACH

LANSING, MICH., April 13—Olds Motor Works is now in production on a new deluxe coach priced at \$1,150. The new model carries as special equipment front bumpers, rear fender guards, trunk and trunk rails, motometer, rear view mirror, automatic wind-shield wiper and step plates.

METAL MARKETS

Full-finished automobile sheets, relatively speaking one of the steel products in most active demand at this time, sell at prices considerably below the parity of other steel products. Of heavier steel products it is generally assumed that in the recent slump they slipped back to about where they were at the year's opening, and that all advances that have been nominally promulgated since then have vanished under the resistance offered by buyers. Full-finished automobile sheets, selling today on a 4.40c., Pittsburgh, base for No. 28-gage, have shed not merely what advances resulted, following last November's election, but have dipped \$4 a ton below the 4.60c. base price which was in vogue up to Nov. 25, when the leading producer's sheet-rolling subsidiary announced an advance of \$3 a ton to 4.75c. Full-finished automobile sheets, in fact, are today the cheapest item in the finished steel list, selling at slightly lower prices than they did on the eve of our getting into the war.

Then, of course, the sheet-roller's semi-finished material, open-hearth sheet bars sold at a price 33½ per cent higher than that now prevailing, so that the present selling price for sheets is by that much more advantageous. On the other hand, during the period of depression of the first quarter of 1922, when full-finished automobile sheets sold at about \$1 a ton below the present quotation, sheet bars were to be had at \$29 a ton or \$8 a ton below the present market. Cold-bar finishers report fairly satisfactory specifications from automotive consumers at 2.70c., Pittsburgh. The \$2 per ton advance which cold-bar finishers announced on Dec. 3, has been lost in the general downtrend. Meanwhile, however, their raw material, hot-rolled bars, has receded to about the price level that prevailed previous to their announcement of the \$2 advance.

The cold-bar finisher appears to be in a position to pass advances in his raw material on to the consumer with relative ease as compared with the non-integrated sheet-roller. The latter encounters usually sharp resistance in the sheet-bar market to readjustment on the basis of lower sheet prices, and the present is no exception from this condition. The steel market, as a whole, is living on generous morsels of optimism from its leaders, but there are those who wonder whether the present does not portend a more permanent liquidation of commodity prices than it has been possible to achieve during the many efforts that have been made in that direction in the last four years.

Pig Iron.—The market is dormant with the \$21 base quotation for foundry strictly nominal, and iron available at \$20.50, valley furnace.

Aluminum.—Interesting developments are lacking in the aluminum market. Values continue steady. Full prices continue to be paid for new clippings, and cast scrap for No. 12 alloy is also in good demand for automotive accessories.

Copper.—Producers are of the opinion that it will be possible to lift the market back to the 14c.-level before the end of the month. When the London market resumed activities following the Easter holidays, indications pointed to somewhat more activity on the bull side of the market than heretofore.

Tin.—The general opinion is that a rise in prices is due.

Calendar

SHOWS

April 22-May 7 — Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

May 20-23—Detroit, Second Annual Automotive Maintenance Equipment Show, General Motors Building, conducted by the National Automobile Chamber of Commerce, with cooperation of the Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and the Automotive Manufacturers Association, Sam Miles, manager.

Sept. 21-26—London, England, Annual Cycle and Motor-

cycle. Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.

Oct. 8-17—London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

RACES

April 30—Fresno, Cal.

May 11—Charlotte, N. C.

May 30—Indianapolis.

June 13—Altoona, Pa.

June 20—Baltimore, Washington Speedway, Laurel, Md.

July 26—Paris, Montlhery Track, French Grand Prix.

Sept. 7—Altoona, Pa.

Sept. 30—Fresno, Cal.

Oct. 10—Baltimore-Washington Speedway, Laurel, Md.

Oct. 24—Charlotte, N. C.

Nov. 26—Los Angeles.

CONVENTIONS

May 6-9—Ninth annual meeting of the American Gear Manufacturers Association at William Penn Hotel, Pittsburgh.

May 20-23—Detroit, General Motors Building, National Automotive Service Convention conducted by the National Automobile Chamber of Commerce with the cooperation of Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and Automotive Manufacturers Association.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

National

April 29-30—Tractor meeting in Chicago.

May 26-27—Regional Motor Transport Conference under auspices of National Automobile Chamber of Commerce in Chicago. "Coordinated Transportation" will be the theme of the conference.

June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

Sept. 15-16—Production meeting and exhibition.

Sept.—Automotive Transportation meeting.

Nov.—Service Engineering meeting.

Studebaker Changes Closed Car Prices

NEW YORK, April 13—Price increases of \$50 on the Studebaker Standard Six sedan, and of \$60 on the Special Six sedan, and a reduction of \$100 on the Special Six coach, were announced today. The new and the old prices follow:

	New	Old
Standard Six sedan.....	\$1,595	\$1,545
Special Six Sedan.....	2,045	1,985
Special Six coach.....	1,595	1,695

CHEVROLET MAKING RECORD

DETROIT, MICH., April 14 — The Chevrolet Motor Co. is producing this month an April record of 52,299 motor cars and trucks, or more than 2000 for each working day. This monthly schedule, planned also for May and June, has been exceeded only twice in the company's history.

At the present rate Chevrolet will produce its "two millionth" car early this fall. It will be the first three-speed gear shift type of car to reach that total. Of the cars being made this month, 43,556 are destined for domestic sale, 5234 to be exported and 3500 are to be built at the Chevrolet plant in Canada.

Accelerated by the demand for the improved new series with refinements previously obtainable only in cars of much higher price, the Chevrolet production has mounted rapidly since Jan. 1.

The capacity programme requires approximately 17,545 workers at the twelve Chevrolet factory and assembly plants throughout this country.

The popularity of the new Chevrolet models has developed a unique situation in which sales and production figures practically are identical. Unfilled orders on hand indicate that production for the next three months, even at the high pace set, will be absorbed at once.

CARS INCREASE MUCH FASTER THAN CASH

WASHINGTON, April 14.—Comparing the number of automobiles in use with the amount of money in circulation, the United States Treasury Department finds that the growth in the percentage of automobiles to population is gaining much faster than the per capita amount of money owned.

On April 1 there was \$4,776,167,142 cash in the nation, making each person's share \$41.99. The ratio of automobiles is one vehicle for each 6.3 persons. The gain in the nation's cash "on hand" during the past ten years has been but about 5 per cent, compared with a gain in the number of automobiles of approximately 750 per cent in the past decade.

NEW BUS BODY DESIGNED

PENN YAN, N. Y., April 14—Whitfield and Sons, Inc., body builders, have developed a new type of knock down bus body for export. It will be marketed in South and Central America where because of an extensive program of good road building and liberal laws regarding the operation of buses, the bus business is said to be booming and there is a great demand for American products.

The first of the new bodies is nearly ready for shipment. It has special features which will permit it being packed compactly for shipment as ocean freight. It is light and flexible with a seating capacity of approximately 21 passengers. It is attractively finished with comfortable seats and roll curtains at the side. Boxed ready for shipment the bodies will weigh a little over one ton and occupy but 225 cu. ft. of space in the hold of a vessel.

Ford Purchase Plan Shows Gain in March

DETROIT, April 14—One of the most interesting features of the March sales reports of the Ford Motor Co., is the large number of people who enrolled to purchase cars under the Ford weekly purchase plan. The reports show that plan enrollments averaged more than 1000 a day for the month, the total for the 26 working days of March being 26,826. This is a gain of about 300 a day over the enrollment figures for the last few days of February.

Aside from the large enrollments under the plan, sales for March were 173,182 Ford cars and trucks. Of this number domestic retail deliveries totaled 153,929 an increase of 41,401 over February, indicating improving conditions everywhere throughout the country. Reports covering dealers requirements for the present month also show the demand for cars and trucks rapidly moving upward.

Another healthy condition, at least so far as agricultural interests are concerned, is reflected in the domestic retail sales of 9225 Fordson Tractors during March. This is an increase of 3311 more than were delivered in February. Domestic and foreign sales of Fordsons reached a total of 10,803 in March.

HONDURAS SURTAX

WASHINGTON, April 15—The Tariff Section of the United States Department of Commerce has been advised by the British Honduras Government that effective April 1 a surtax will be levied on imports amounting to one-tenth increase over the present import duties on all imported commodities. The tax is to remain in effect until March 31, 1926. Automotive productions heretofore admitted free are not affected, only just such items as are taxable under the present law being subject to the increase.